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THE LATEST advices from Australia state that heavy rains have fallen in Victoria, and over a considerable portion of New South Wales. The waterfall has been so considerable, that Australian authorities consider themselves safe in saying that the long drought is broken. This will open the way for a recovery from the depression, which has prevailed in the Australian Commonwealth for so long. The rains will be of immense benefit to the mining industries, which, although they have held up remarkably well under the depressing lack of water, have nevertheless felt it severely. We look for a revival, not only in mining, but in all other business, and congratulate our Australian friends on their improved prospects.

⚒

THE MINING AND smelting operations of the Granby Company at Grand Forks, B. C., have received unstinted praise from a source which must be most gratifying to the technical men who direct that successful enterprise. When a man so experienced as Mr. John Stanton gives his unqualified approval to the methods in use, there is proper ground for congratulation. The cheap exploitation of the enormous bodies of ore exposed in the mines is to be credited to Mr. W. Y. Williams, who has reduced mining expenditure to $1.20 per ton; the treatment of the product is under the direction of Mr. A. B. W. Hodges, who is making a copper matte for $1.35 per ton. It is with great pleasure that we record this successful work on the part of our professional friends.

⚒

IN OUR DISCUSSION DEPARTMENT this week there appears an account of the methods of ore sampling in vogue at one of the best organized mines at Johannesburg. The information given by Mr. Denny will be read with especial interest by those engineers who have not been to the Transvaal. It is by the comparisons of technical practice in regions far apart that this JOURNAL hopes to render the best service. With this end in view it is intended to republish, in pamphlet form, the articles on mine sampling and the estimation of ore underground, together with the valuable discussion which these articles have elicited. To the younger men especially, the information and advice, thus collected in convenient form, should prove of practical use; and when any work is of service to the men to whom the future belongs, such work has fulfilled its chief purpose.

⚒

THE PROCESS of re-adjustment of values in the iron and steel trades, upon which we have apparently entered, is a necessary, though not generally a pleasant one. It does not mean that the prosperity of the trade is diminishing, or that the volume of business is declining to any serious extent. There are no signs of that, as yet. The fact is, that during the boom period—as in all similar periods—prices were carried too high, to a point which threatened to give a serious check to consumption. Manufacturers find their customers at large reaching a point where they limit purchases, rather than pay current prices. Many of them have taken the warning, and, in their turn, insist on lower terms for their raw material. The pig iron quotations have been the first to show the effect; but other products will soon follow. The concentration of production in recent years may enable the larger interests to delay and regulate the downward movement; but they cannot stop it.

⚒

A GREAT DEAL is said about exports of gold when they are made; but very few people stop to reflect that they are really much less in amount than the metal we are adding to our stock, which is already the largest owned by any nation in the world. In the recent gold export period some $15,000,000 was sent to Europe. This seems a considerable amount; but our own production is about $6,500,000 a month, and we are receiving considerable amounts from the Canadian Yukon. The Treasury Department's estimate of the available gold in the country on June 1 puts the total at $1,261,445,124. For various reasons we are inclined to think this an over-estimate; but the fact remains that the United States has over a billion and a quarter in gold. No other country in the world can reach this figure. It is true that comparatively little of it is in circulation, in the East, at any rate; but it serves as the solid basis for Government and bank issues, and is therefore really in the service of trade.

⚒

TELLURIDE AGAIN.

After the assassination of Arthur L. Collins, last November, a spirit of opposition to disorder and lawlessness caused the citizens of Telluride, Colo., to demand legal action. A grand jury was called and a number of men were indicted as having been privy to the murders and riotous assaults which has disfigured the record of a splendid mining district. Now comes the sequel. When court met recent-

ly, the sapient judge announced that he had called the grand jury last December in an irregular manner. All the indictments were quashed. This happened late on a Saturday night. On the Sunday following, it was understood that the district attorney was preparing new indictments. A tremendous snowstorm, terrible even for that mountainous region, came on; and in the teeth of it, those who had been indicted fled across country, catching the train at various points and so escaping.

Such happenings as this make a fool of the law and constitute an impertinence to justice. So long as criminals can get the best legal talent arrayed on their side, while the law of the land is administered and upheld by men competent only for political office and for positions which are the reward for political activity, so long will there be a premium on lawlessness in our mining regions.

There is only one remedy for this state of affairs, and that is enlightened public opinion. If the good men in the community are afraid to speak out, save when they feel an occasional spasm of civic virtue, then there is little likelihood of the development of a healthy reprobation of such methods. And this applies to larger communities no less than to a mining settlement like Telluride.

⚒

THE SUBSIDENCE OF BOSTON.

The announcement that the ground upon which Boston stands is sinking, at the rate of one foot in a century, has provoked surprise, if not incredulity. According to recent careful surveys, made by Mr. J. R. Freeman, it has been found that the land, on a comparison with mean sea level, has sunk 0.71 ft. in the past 72 years.

The slow sinking of the Atlantic Coast is a fact well known to American geologists, but the definite measurement of the rate of that subsidence is a matter of scientific interest. As long ago as 1868, the late Prof. George H. Cook, State Geologist of New Jersey, investigated this matter very fully, collecting numerous observations indicative of the encroachment of the sea on the New Jersey shore. Later investigations, made by the United States Geological Survey, have demonstrated that this is no local occurrence, but a condition characteristic of the entire Atlantic seaboard.

In other parts of the world similar observations have been made. Along the eastern coast of England the sinking of the land relative to sea level has been a serious matter during recorded history; villages lie buried under the salt marshes and the waves now sweep over submerged forests. On the other side of the North Sea, the Norwegian coast is rising rapidly, that is, geologically speaking. Observations show that the Scandinavian coasts are being elevated at a mean rate of 2.5 ft. per century; the maximum rate, at the North Cape, being nearly twice as much. The Pacific side of South America is rising rapidly, Charles Darwin, when on the *Beagle*, having been one of the first to draw attention to the raised beaches on the coast of Chile, where plaited reeds and other evidences of human handiwork were found buried among marine shell deposits at a height of 85 ft. above tidewater.

Such observations as these, usually disregarded by the non-scientific, become impressive to the average man when he finds, by the evidence of landmarks, that the ground under his very feet is unstable. It brings home the great facts which underlie the study of geology, and suggests that even the apparently catastrophic events of geologic history, as written on the pages of rock and stone, are the result of quiet forces acting with that unwearied patience, "which hardens the ruby in a million years." When Sir Charles Lyell saw the stupendous folds and inversions of strata which characterize the Swiss Alps he remarked that all such apparently violent results might well have taken place without any interruption of the habitable state of these mountains, had man been then in existence, which he was not. Considerations such as these enlarge the imagination and serve, as astronomy does, to illustrate the poetry which lies often buried deep in dust, amid the dry pages of science.

"There rolls the deep where grew the tree,
O Earth what changes hast thou seen!
There where the long street roars hath been
The stillness of the central sea."

⚒

ELECTRIC DRILLS.

The recent discussion, in this JOURNAL, of the weak points in the electric drill as compared to those which are driven by compressed air, has brought out the expression of an earnest hope among mining engineers that the electric drill may become a practical success in mining. We share this hope. There are reasons for believing that it will be fulfilled.

The air drill, in principle and in effect, is a simple engine. It has a piston, and piston-rod in one piece, valves, etc., and can, of course, be operated either by steam or by air. The chuck holding the bit forms the end of the piston rod. In employing the reciprocating action of the engine, it belongs to a simple type of mechanism.

Electric drills have employed various principles. The solenoid type has now been generally abandoned by inventors, on account of the fact that in practice it was found that the solenoids became highly heated, after a short period of running. This heating had a tendency to destroy the insulation, and when the insulation was finally effected by means of mica, the heat, when it extended far enough, was found to melt the wire. This type of machine was built on the plan of the reciprocating drill, and in this respect resembled the air drill; but it had many serious defects in construction, due to having to fasten magnetic to non-magnetic material, etc. Some of these troubles have been overcome by the Marvin drill, which is the best of this type. It is in active use in several Mexican mines, especially those in which the rock is not very hard. The next type of electric drill was that which used an ordinary electric motor, set at some distance away from the drill proper, the power being transmitted from the motor to the drill itself by means of a flexible shaft. There are many serious objections to this machine when in operation, by reason of the detail of the rigging, the amount of attention required in removing all the different parts each time the drill is taken down, the wear and tear of the mechanism, when exposed to the muck and wet of the mine. This type, however, has been used in many mines with some success, and is still being tried. The Gardner and Durkee machines are the best examples. In the latest form of electric drill the motor is mounted upon the drill frame and the rotary motion of the motor is transformed into reciprocating movement by means of special devices. To this class belong the Box and the Locke drills, which are recent inventions.

The objection to all the electric drills yet invented is the delicacy of the mechanism, the care with which they must be handled in order to work at all for any length of time, the amount of repairs, which must be done by an experienced machinist instead of the usual "jack" variety employed at most of the mines, and the exposure of the small parts to the rough usage and handling which air drills uniformly receive, and which all drills must receive underground, until every drill runner shall become an experienced and careful machinist. Vibration, inseparable from force by percussion, tends to break electric contacts and thereby produce short circuiting, so that the insulation is destroyed.

At a first glance the electric drill undoubtedly looks very desirable, inasmuch as it takes comparatively very little power, while electric wires are much easier to install than air pipes (unless the air be necessary in the mine for ventilation, or for other uses, to which electricity cannot very well be put); the original installation is less expensive, if dynamos be already in use for other purposes, and the working costs will be much less if the present excessive repair item can be reduced. An ordinary 3-in. air drill requires about 15 h.p., the ordinary electric drill on the market from 2 to 4 h.p., although it is not fair to draw a comparison between the two on this basis for the reason that the air drill does a great deal more work in the same time than the electric drill, as there is much more power behind it; while the electric drill does unquestionably do more work per horse-power than the air drill, estimating the horse-power at the boiler or water power, it does not do enough more to warrant the expenditure of 15 h.p. as against 2 h.p., if other conditions were equal. This is another objection to every electric drill which has yet been invented, particularly in very hard rock.

The air drill as a factor in ventilation may or may not be of value, according to conditions. In the first place, with the single-stage compressor, the liability to combustion of the oils used in lubrication (unless care is taken to condense all resulting gases with the moisture by means of an air receiver intercooler), will occasionally render the air actually poisonous—a fact lately discussed in these columns. Next, the fact of air being supplied by drills is only too often, in small mines, made an excuse for neglecting the systematic connection of workings with a view to a natural circulation of air. Again, the fetish of "ventilation" is a standing excuse for leaking valves and pipe-lines, such as are commonly seen underground. The amount of air which escapes without doing any work through such leaks, small but constant, represents a considerable portion of the work done by the compressor of a large mine. The plea of "ventilation" is the last excuse of a careless shift-boss, and, by excusing leakages, it tends to become a disgrace to mines, which are otherwise well managed. While it may be practicable to run blind headings cheaper by air-drills than by an electric plant which would require the addition of a ventilating apparatus, it comes to this, that there is no ventilation equal to a natural circulation of atmospheric air, and in mines where electric drills are in use, this fact is apt to be better

recognized than in those in which compressed air is being fed.

When the air drill was first introduced the old-fashioned miner did his best to kill it. Even to-day try to introduce a new air drill into a mine and attempt to make a test between it and the machine already established in use, and you will find how difficult it is to get fair treatment for the new device. Ask the foreman to make a month's trial of a few Ingersolls where the Sullivan is in use, or a Rand machine where Leyners are established, or vice versa, and you will find that in nine cases out of ten the men will "knock the stuffing" out of the machine to which they are not accustomed—and which, for that *one* reason, they do not want to have introduced into the mine.

The electric drill, like most electric machinery, is unfamiliar to the man underground; he can hit the ordinary air drill with a sledge hammer, he can drop it down a winze, he may allow it to be battered by the rock thrown out by a blast, but it still "goes" serenely. It is essentially a practical tool for use in mines. Eventually doubtless the electric drill will be simplified, strengthened and cheapened; when this has been accomplished and more power can be put into a single drill, and those who delve in the darkness underground become used to it, so as to treat it with kindness and "give it a show," then we may find at last that the power which has worked such marvels on the sunlit surface, will give its energy to the hands that push their patient way into the adamantine heart of the earth.

⚒

MARKET CONDITIONS

The metal markets generally continue unchanged and rather dull. The continued liquidation in Wall Street may be partially accountable for this, but the strikes in the building trade and other labor disturbances have had more influence. These matters have made themselves felt, in spite of the continued large consumption in almost all lines, and other indications of prosperous trade.

Copper has been quiet, with comparatively little doing. Consumers have been holding back, and showing but little interest in the market. This course, however, seems to be adhered to in the face of the undoubted facts that stocks in manufacturers' hands are being gradually drawn down to a very low point, and that it will be necessary for most of them to come on the market for fresh supplies in a very short time. There have been reports of a heavy sale made for July and August delivery by a large producer, but it is impossible, at the present writing, to verify this. On the London market, prices are still feeling the effect of the recent bear raid, but in Great Britain, as in this country, manufacturers' stocks are generally very low, while the public stocks are smaller than for a good while past. There is no doubt that both Great Britain and Germany must shortly be purchasers again for their current supplies.

Tin is rather stronger, spot supplies being comparatively low; while consumption continues at a fair rate. The market will probably be relieved before long by fresh arrivals.

Lead shows a fair business at the reduced prices. Deliveries of metal are a little better, as the railroads are gradually recovering from the effect of the Western floods, and shipments from St. Louis have been resumed.

Spelter continues very high. It is evident that the present consumption is still above production, and the consequence is a scarcity of metal for early deliveries. The reports from the Joplin District are a little more favorable, most of the mines, which had been flooded, having resumed work. Prices of ore still continue high, and the smelters are unable to secure all that they need. The total sales of ore up to date this year are considerably below the corresponding period last year, and it will probably take some time to make up the difference, although the ore is really needed.

Silver remains quiet, showing little change either in demand or in prices. Eastern buying continues rather light, and there have been no special orders on the market.

In the iron trade, the condition of uncertainty still continues. Buyers are holding back, in the hopes of securing further concessions, and, as is frequently the case at such times, are trying to hold out until the bottom of the market is reached. It looks very much as though we were nearing that point, although quite probably some further reductions in quotations may still be seen. In foundry iron, there has been some purchasing, chiefly on account of the immediate necessities of consumers. Finished material remains comparatively quiet, with occasional orders here and there, but no considerable placing of new contracts. The strikes in the building trades still interfere with the demand for structural material. A week ago it looked very much as though a settlement was at hand, but since then conditions have developed which may tend to delay it still further. The same conditions exist as in the metal trade; that is, there is a very large consumption, stocks are being drawn down, and it is quite evident that manufacturers must soon be in the market again.

In the Western coal trade, supplies generally are good. The Lake trade is still very heavy, and some complaint is beginning to be heard about delays in delivery and in transfer to vessels.

The seaboard bituminous trade continues to show improvement, and prices are somewhat firmer. Shipments from the mines and the coastwise movement of coal have been somewhat hindered by the weather.

The anthracite trade continues very active, though the fear of a serious strike of the miners has past. Cold, damp weather makes retail demand better than it usually is at this season, while the general desire of dealers to lay in supplies as soon as possible, prevents any slackening in wholesale trade. The outlook favors a very heavy output for the year. Shipments from the mines may exceed 60,000,000 tons.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The process of scientific discovery is identical with everyday thought, only with more care.

There is no more convincing proof of the truth of a comprehensive theory, than its power of absorbing and finding a place for new facts, and its capability of interpreting phenomena, which had been previously looked upon as unaccountable anomalies.

About sixty years ago there was much talk—as there is now—that geologists ought only to observe and not theorize. At this rate a man might as well go into a gravel-pit and count the pebbles and describe the colors. It is odd that any one should not see that all observation must be for or against some view, if it is to be of any service.

Science is a general name for human knowledge in its most definite and general shape, whatever may be the object of that knowledge.

A man who talks about what he does not in the least understand, is invulnerable.

While admitting as a fundamental truth the proposition of the identity of forces in present and past (geological) times, Prestwich contended, in 1892, that the exhibition of these forces has been unequal in degree. The contention for this uniformity is based solely upon the value of man's personal evidence, and when the term of this is compared with that term beyond which it does not extend, the propositions are such as to render it comparatively useless.

Prestwich, in 1885, agreed with Osmond Fisher in supposing that a thin terrestrial crust rests on a slowly yielding viscous layer, within which lies a solid nucleus. The aqueous vapor in volcanic eruptions he regarded as due to the surface and underground waters, with which the intensely hot magma of the interior comes in contact, and he believed that the actual cause of the rise of molten material and the outflow of lava is to be sought in the effects of the secular refrigeration and contraction of this planet, the cooling and shrinking outer shell compressing and forcing out the intensely heated material inside.

A Dublin professor is said to have stated to his class: "Gentlemen, the Hon. Mr. Boyle was a great man. He was the father of chemistry, and uncle to the Earl of Cork," from which his pupils worked out the conclusion that chemistry and the Earl of Cork were first cousins!

The questioning of accepted theories and the investigation of the data upon which they are founded, are both desirable occasionally. It is well to look into the cellar and see how much gold there is there, and determine whether the quantity of bullion justifies the circulation of so much paper.

The deepest hole drilled in this country is said to be the oil well of the Forest Oil Company, West Elizabeth, Alleghany County, Pa. It is 5,575 ft. deep.

In the foundry all iron can be used in one place or another; and if the buyer finds among his iron something that grades between a No. 1 and a No. 2 it is not necessary to reject it; he can find use for it. There is no poor pig iron; it is a question of finding the right place for every kind of iron.

One of the great problems, or mysteries, of trade is the absorption of silver by India and China, which is shared to some extent by other Eastern countries. Ever since Europe began to trade with the East, it has been taking all the silver it could get; and at the present time India and China take approximately one-half of the silver which the world produces yearly. It is true that silver is the money of those countries; but the people are poor, their daily transactions are on a very small scale, and the amount of money required for circulation is very much less, in proportion to population, than in the United States or Europe. The East does not export silver; it keeps what it gets. All sorts of theories have been advanced by all sorts of economists. None of them has satisfactorily explained what has become of the silver, or where are the great accumulations, which undoubtedly exist, but which cannot be drawn out, even by famine.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

MINE SAMPLING.

The Editor:

Sir.—I have followed with great interest your series of articles on "The Sampling and Estimation of Ore in a Mine," and with your permission will make some comment thereupon, from the standpoint of the practice followed in the group of mines of which I am the technical head.

The function of sampling is now well recognized on these gold-fields as one of the most important contributions to the commercial success of the mines. The old-time hap-hazard method of promiscuous sampling, either by taking pieces of ore from trucks, or "picking" down odd sections in the mine, has no present adherents, nor is the work of sampling relegated to the inexperienced "new chum,"* who formerly, if not thought intelligent enough for any other class of work, was provided with a sampling job. The enormously valuable part played in the economy of mining by systematic and conscientious sampling is now well recognized; a class of skilled intelligent alert men, culled largely from trained engineers, has arisen, and these have raised the status of mine sampler from inferiority to one of importance. It is gratifying to read that the peculiar and constant calls upon the integrity and will of the sampler have been duly acknowledged in the articles under review, and I believe the mine sampler will be encouraged and assisted to still greater efforts because of them.

In your introductory article you dwell upon the fact that methods of mine valuation and examination have undergone very considerable development during the past decade, and you indicate the possibility that the close attention to this part of gold mining business on the Rand has, to some extent, influenced for the better the mining industry at large. Speaking as an Australian, and being also personally acquainted with American and European methods of some 10 years since, I can cordially indorse the views which you have expressed as to the present advanced stage reached in the practice of mine sampling and valuation compared with the period I have named. Nor does the advance relate only to other countries; it is true no less of the Rand. The systems now in vogue represent the outcome of evolutionary growth and are based upon experience and sound principles, but the writer well remembers some few years ago having to deal with assay-reports and plans which were prepared and averaged in the most elementary fashion, without any regard to widths of reef or intervals between sections. Now, happily, these instances are rare, and, in fact, so far as the Rand is concerned, things of the past, and the engineer is no longer troubled by enormous discrepancies between assay-reports and milling returns, making, of course, the allowances which ex-

* This is the colonial equivalent of our Western "tenderfoot."—EDITOR.

FORM No. 99.

Meyer & Charlton Gold Mining Company, Limited.

MINE VALUES.

Duplicate

Shaft South Reef 10th Level East Drive

No 1 West (25 Stope) East Face Date 28/1/03

Mark on Sample.	Distance from.	Width of Reef. ins.	Waste. ins.	Sample ins.	Assay of Sections dwts.	Stoping Width. ins.	Assay Value over Width Sampled dwts.	Assay Value over Stoping Width. dwts.	Assay Value over 36". dwts.	Assay Inches.
148	10' up	6		11	7.5					82 5
149	"	15		19	10.					190.
150	"	15		18	2.5	66		6.5		45.
151	"	18		18	6.5					117.
			10							
152	20'	8		10	5.					50.
153	"	14	7	16	9.					144.
154	"	18		18	6.5	82		4.		117.
155	"	21		21	1.					21.
			8							
156	30	3	6	7	8.					56.
157	"	13		15	12.					180.
158	"	16		16	4.5	86		4.7		72.
159	"	16		16	1.5					24.
160	"	14	3	15	5.					75.
			2							
161	40'	9		15	3.5					52.5
162	"	10	15	18	2.	72		1.5		36.
163	"	15		16	1.5					24.
			6							
165	50'	4	3	8	11.					88.
166	"	6		14	4.5					63.
167	"	17	18	18	1.5	88		2.7		27.
168	"	18		18	3.5					63.
			9							
						394				1527

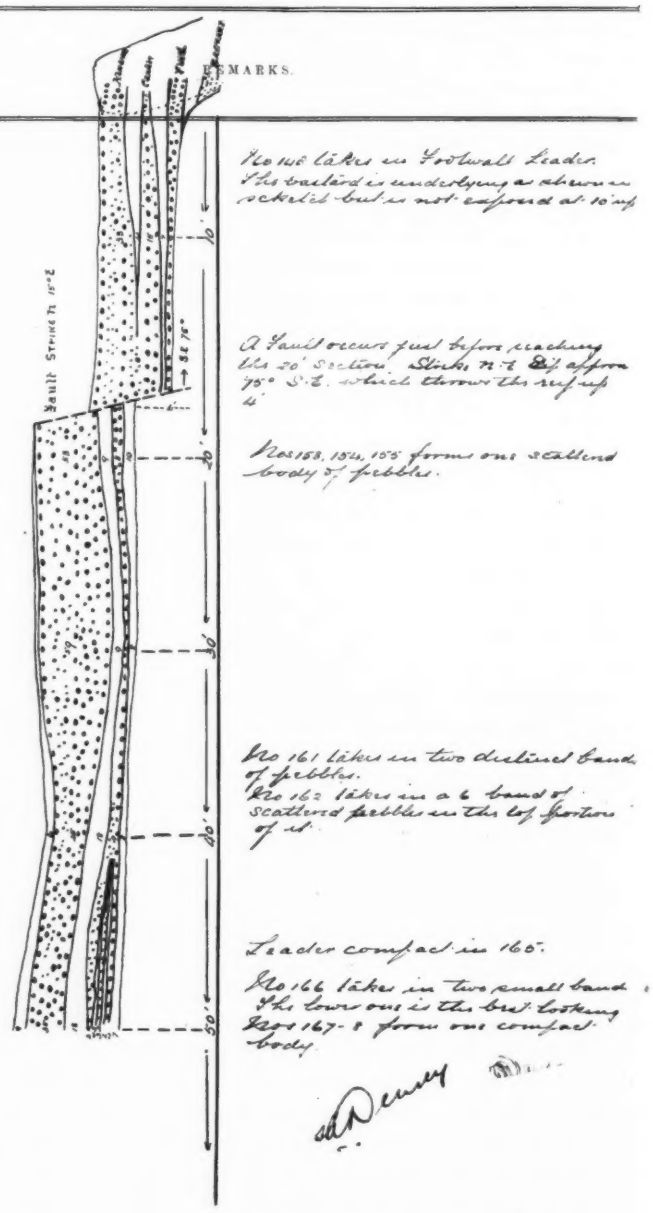

REMARKS.
Fault Strike N 15°E
10'
20'
30'
40'
50'
No 148 lies in Footwall Leader. This valuation is underlying a shoot of richness but is not exposed at 10' up
A Fault occurs just before reaching the 20' Section. Strike N 7 E & throw 75° S.E. which throws the reef up 4'
Nos 153, 154, 155 forms one scattered body of pebbles.
No 161 lies in two distinct bands of pebbles.
No 162 lies in a 6 band of scattered pebbles in the lef portion of it.
Leader compact in 165.
No 166 lies in two small bands the lower one is the best looking
Nos 167-8 form one compact body

FIG. 1.—EXAMPLE OF ASSAY SHEET, MEYER & CHARLTON MINE.

perience dictates as necessary between mere assays and actual recovery.

The engineer practicing on the Rand recognizes that here is, *par excellence*, the field which lends itself to the application of method. The banket beds, while fluctuating violently both in width and value in local areas, are unparalleled for consistency when considered throughout the Witwatersrand area, and the great range of development made possible by the natural condition of the ore and gold deposition give quite unusual facilities for estimation and the application of the law of averages. That these facilities have been recognized and embraced is undoubtedly creditable to the engineers, past and present, on the Rand, but it cannot be gainsaid that the conditions were such as to make the scheme almost self-suggestive. In looking back over one's past experience in other countries and taking the natural conditions generally present in quartz deposits into account, whether these have been exfiltrated into previously existing fissures or segregatious within rock masses, and considering further the small amount of development done upon the "prospect" which one was engaged to examine and value, and at the same moment transporting oneself mentally to the mines of the Rand, the conclusion is forcibly impressed upon one's mind how exceedingly advantageously situated is the man working on these fields, and how, in comparison, the risks of error he runs, given careful work, are minimized to the last degree in comparison with the engineer who is employed on deposits of a different character.

Mine examination in South Africa is shorn generally of many of the dangers present in pursuing similar investigations either in America or Australia. The mine salter, with his many ingenious methods of introducing gold either in the ore face or into samples, is unknown. The assayer who returns high-grade results from "grindstone" specimens has not flourished. The reason probably why there is no room for people of this class is that banket mining is essentially a capitalist's operation.

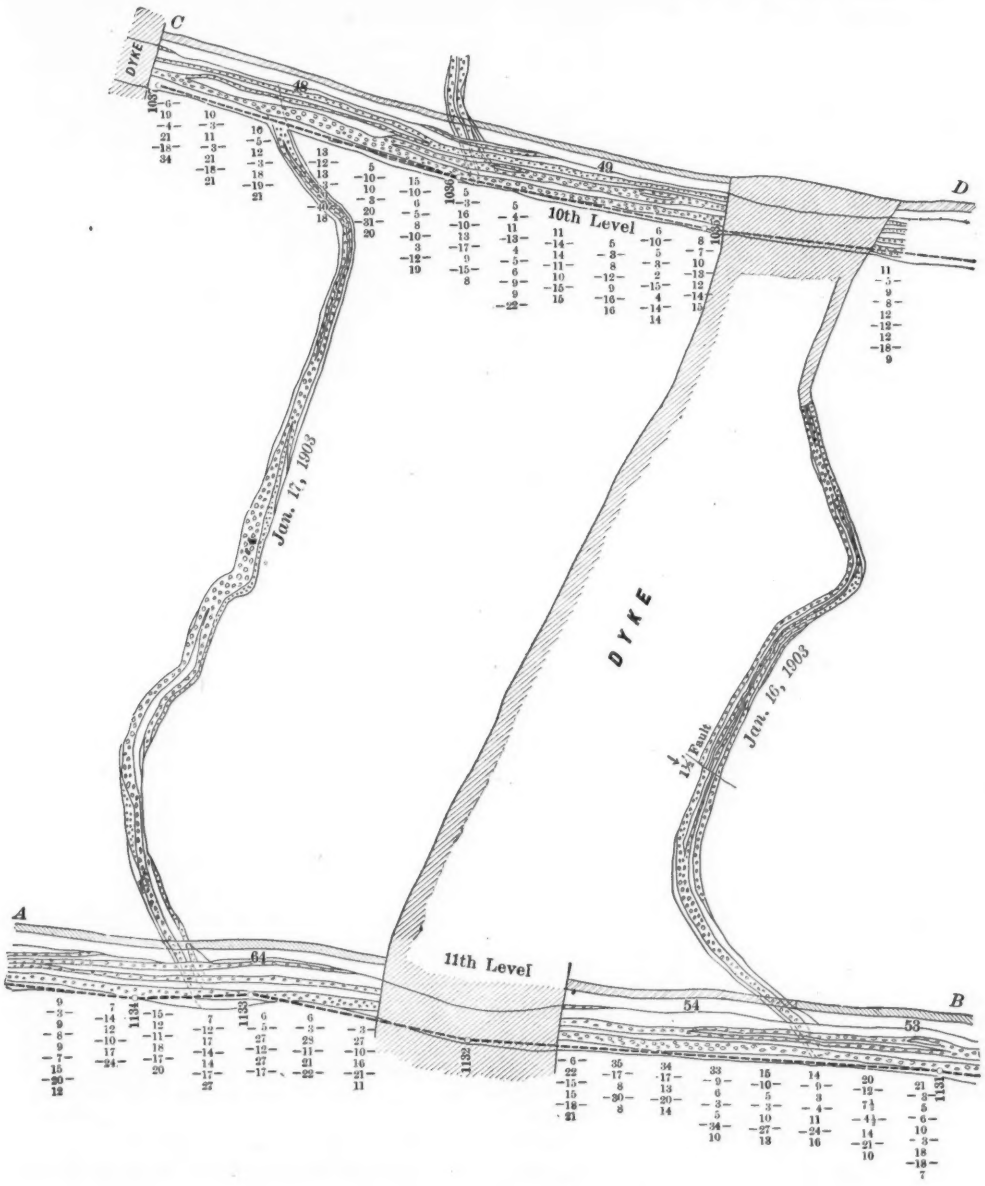


FIG. 2.—ASSAY PLAN OF DRIFTS IN MEYER & CHARLTON MINE.

(The bands AB and CD do not represent drifts or other mine workings, but a line of tinting in the original. As Mr. Denny's description indicates, it is customary to mark the average value of different lengths of reef by different tints on the mine map, so that the general value of the ground can be seen at a glance.—EDITOR.)

In quartz, or in other forms of ore deposit, the metal worked may occur in rich bunches, which enable a prospector of limited means to collect sufficient of it to pay his way. In banket this is not the case, and therefore the banket bearing ground is sold on option to a company financially strong enough to exploit it. In the case of the examination of mines the personal incentive to defraud for profit is wanting because the mine is owned generally by a company, and individuals are not interested sufficiently to make it worth their while to seek means to create results more favorable than are actual. No claim can therefore be made that persons connected with the gold mining business here are more scrupulous than elsewhere. The simple fact is that opportunity seldom arises for an individual to perpetrate fraud for his personal advantage, owing to the special conditions of the case, and hence, having no temptation to err, all are alike honest.

I cannot quite agree with you, Mr. Editor, in your statement that "average value of the ore in the past can be ascertained from the records of a mine" if by "ore" you intend to convey the **larger** meaning of the exhausted portion of the mine. In my experience I have found it just as necessary to make an inspection of the exhausted portion of the mine as of the current producing section, for the following reasons: Firstly, to prove to my own satisfaction that the mine has been fairly worked in regard to area of reef. It will readily occur to the reader that a mine can be easily manipulated to show high returns over a short period. Take the case of a mine which has two widely separated narrow rich shoots of ore. On such a proposition it would be possible to develop for a period of one year, and at the expiration of that time commence milling on high-grade rock. Assume that during the 12 months 100,000 tons of ore have been developed at a cost of £25,000, but that actually the rich pay ore represents only 25 per cent of the total tonnage. Then the charge for the redemption of the ore would have to appear in the working account as at 4 by 5, or 20s. per ton milled, and it is obvious that such a charge would require unusually rich rock to bear it. It would also be doubtful if a mine yielding so low a percentage of pay-rock could be developed fast enough to supply any but a mill of very small capacity.

The second reason why it is important to examine former workings in a mine under examination is to find out the relation between reef width and stope width. It has occurred in the writer's experience that the grade of a mine showed much lower than its mean average, because of including unpayable bands of reef or waste in the stopes for the purpose of showing low working costs.

Now, it is indisputable that mines should be operated for profit per ton, and such an objective as low operating costs is quite unjustifiable, excepting after the consideration of the main issue stated. I believe it will be agreed therefore that "the average value of the ore in the past" is not a criterion for the engineer to accept unquestioningly, otherwise in the first instance quoted he would be liable to have his judgment of the existing development prejudiced too favorably, and in the second instance the past records might lead him, even in the light of present satisfactory development, to put much too low a value on the mine.

Mines in New Districts.—You have plainly indicated some of the precautions to be observed by the engineer in estimating values of undeveloped mines in new districts, all of which are pertinent. It seems to me that one chief difficulty in estimating values in mines so placed is the want of facilities for observation. The engineer is called upon to decide whether a certain "prospect" is valuable or otherwise, and the available data upon which his judgment and previous experience are brought to bear are often meager in the extreme. Perhaps the points exposed are widely separated; he has no opportunity of studying dike or fault effects, nor the probable width or trend of the shoot, nor, in fact, any of the vital factors entering into the ultimate consideration of the value of the mine as a commercial undertaking. He is therefore forced to one of two alternatives, either (1) to intuitively sum up the value of the property, or (2) to refuse to commit himself to an opinion until more work is done. The first alternative will always be avoided by the judicious engineer in favor of the second, both in his own interest and in that of his client, for the reason that a hazardous guess is not science, nor is it consistent with sound professional practice. The new district is always fertile in the class of property that is alleged to yield ore of the same grade as that in some adjacent successful district. In this country, for instance, it is usual to find the prospector or claim-holder filled with the conviction that as the working costs on the Witwatersrand approximate to 6 dwts. of fine gold

per ton milled, he has only to establish the fact that he has 7 dwts. assay value in his ore to claim payability. He conveniently forgets, or probably does not know that from an assay value of 7 dwts. he can only recover by the ordinary processes 4.2 dwts., which would leave him 1.8 dwts. on the wrong side, figuring costs at 6 dwts. per ton. The engineer has therefore to be careful when fixing the value of a proposition to allow, as a margin of safety, that only 60 per cent of the original assay will be recovered. And here I would plead for the general expression of values in terms of currency, as—in speaking of gold—ounces may be fine ounces, worth 84s. 11d., or bullion, worth 50s. per ounce; and in all cases the estimated recovery values of ore per ton treated

markable differences in sampling a length of, say, 500 ft., at 10-ft. intervals, and subsequently sampling again at intermediate points, and the difference as shown by the original 10 ft. sampling and the mean of the first and second has often been sufficient to reverse the conclusions arrived at from the 10-ft. intervals. The importance of taking the samples at regular distances cannot be over-estimated.

Sketching Samples.—The system of sketching samples, as employed by the writer, is illustrated herewith, and is based upon a scheme suggested by Mr. F. Burnham, now in the employ of the State Mining Department. This system gives in detail a longitudinal section of the shaft, level, or winze, in a continuous length, and is specially valuable when dealsay values are shown in general monthly averages.

If the widths of reef fall below 36 ins., the actual width of the reef is shown, but the value is calculated always upon a minimum of 36 ins., and appears as upon that width opposite the actual reef width, the reason being that we never estimate the stoping width as likely to be less than 36 ins.

The scheme of the continuous section plan is to provide details of each sectioned portion of the reef, and a continuous actual sketch of the reef in the levels. Referring to the extract, it will be seen that the sections sampled are shown separately, referring in each instance to the reef matter and waste in their alternate bands.

The average recovery value of the reef is shown

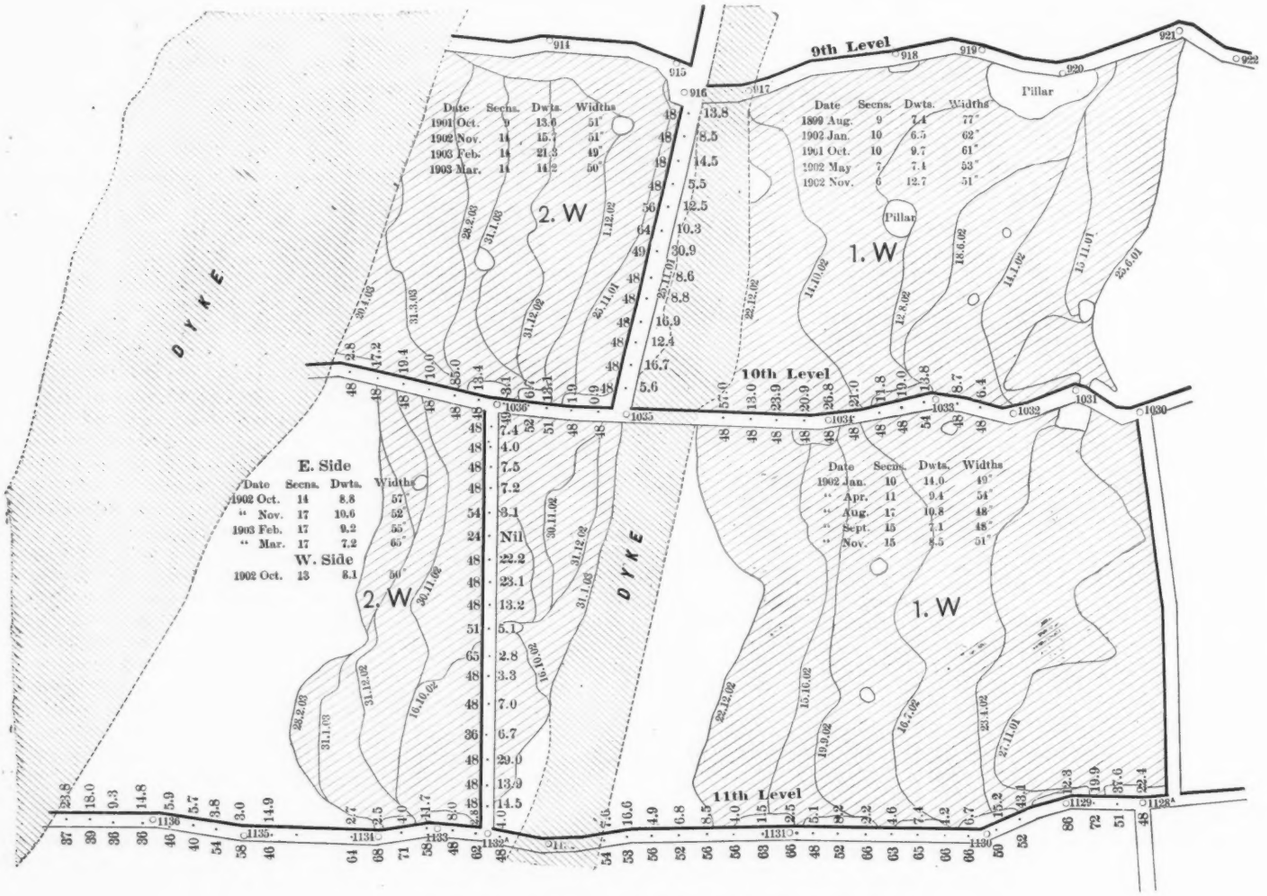


FIG. 3.—ASSAY PLAN OF PORTION OF MEYER & CHARLTON MINE.

should be given and expressed as so much money value per ton.

The Cost of Mine Examination.—I observe with satisfaction that you have drawn attention to the cost involved in mine examination. In two recent instances of developed mines sampled under the writer's supervision, the number of sections totaled about 5,000 in each case, the cost of assaying alone—apart altogether from the labor involved in obtaining the samples—amounting to an enormous figure. It frequently happens also that, prior to an examination, the mine workings have to be cleared of water. This is an operation costly in proportion to the quantity of water to be handled. The writer has had instances of pumping charges amounting to over £1,000, and a monthly cost while the examination was in progress of £350 for this item alone.

The Sampling Interval.—In all mines under the control of the writer the sampling interval is 5 ft., and no longer spacing is, in his opinion, to be recommended. The preliminary examination made by the engineer ought to decide whether the mine is worthy of examination or not. If it be, then the 5-ft. interval should be adopted. I have found quite reing with reefs having a tendency to split. The loss of any part of the reef is plainly denoted in the continuous section, and if of sufficient value the lost portion can be re-attacked.

Recording Samples.—The recording of the samples is plainly shown in the accompanying sheet, which is a copy of a sampler's usual return on the Meyer & Charlton Mine. It will be observed that waste rock is always separately shown, and in the actual sampling it is never sectioned, but simply measured.

Assay Plans.—Of these, two are kept, one being the ordinary outline development plan, and the other a continuous section plan. Specimen extracts from the actual plan are attached herewith. The scheme of the outline plan is to show both development and stope values, the width sampled appearing on the one side, in the case of levels, etc., and the value as upon the estimated stoping width on the other; the minimum stoping width for purposes of calculation being 36 inches. Referring to the plan, it will be seen that the widths are shown in blue and the values in red. The outlines between the levels show the stope faces for the various months, and the as-

on continuous section plan by different colors represented as under:

	Per ton.
Black indicates a recovery value of	0s. to 20s
Blue indicates a recovery value of.....	20s. to 25s.
Green indicates a recovery value of	25s. to 30s.
Mauve indicates a recovery value of	30s. to 40s.
Yellow indicates a recovery value of	40s. to 50s.
Violet indicates a recovery value of	50s. to 100s.
Grey indicates a recovery value of	100s. and over

The recovery value (given in shillings) means the actual estimated gold per ton, which from the different processes the ore will yield, and is roughly based on 70 per cent of the actual mine assay-value, postulating a sorting basis of 20 per cent.

G. A. DENNY.

Johannesburg, Transvaal, May 11, 1903.

(Mr. Denny refers above to the colors used to denote various values on the sampling diagrams in use at the Meyer & Charlton Mine. The limitations of our printing-press have compelled us to substitute in the diagrams, cross-hatching for colors. The explanation is given on the diagram itself, on the page above.

In reference to the sampling sheet, given under Fig. 1, it is well to add that the total of stoping widths, in inches, viz., 394, and the total of assay inches, viz. 1527, is carried forward to the end of a series of sections or lengths, of drift or stope, when the latter is divided by the former, which then gives the average value in dwts. of gold per ton.—EDITOR.)

THE GEOLOGIST IN MINING.

The Editor:

Sir.—I have read with much interest the discussion in the columns of the JOURNAL regarding geologists, engineers and practical miners in connection with the purchase, development and operation of mining properties.

I have been for the past 20 years engaged in mining in different parts of the country, and during these 20 years I have had a varied experience. I have met geologists and geologists, engineers and engineers, and practical miners without number. My experience with the latter has been chiefly in trying to rehabilitate properties that had been butchered on account of utter ignorance of all scientific methods of procedure. In my mind these three men occupy separate and distinct positions in the general economy of a mining proposition, and I do not see any reason why there should ever be any conflict.

The geologist and his knowledge are invaluable when an unknown district is to be considered, and a treatise on the geologic history and a scientific description of the different formations is desired. He tells us the age of the different rocks, etc., and what minerals should exist among them, and also how these minerals were formed or deposited, and the probable wealth of this particular district in these minerals. His report is instructive and interesting, and it is my opinion that, with this report, his duties in the premises should equal. Now the mining engineer comes in.

He, of course, must have some knowledge of geology; even if he has not made a study of it (as all mining engineers should do), he will unconsciously absorb it in the practice of his profession, and—quoting Mr. H. H. Knox in his article, dated May 30—"His reading of the rocks is largely subconscious," and he never realizes how much he is indebted to this science, which has gradually become a part of his nature, and is at once a guide and a monitor to him.

The engineer, before making an examination of a mineral property, the development of which is contemplated, should carefully read up on the geology of the territory to be examined, unless he is already familiar with it. He then goes with, at least, some valuable hints to guide him; his own knowledge and experience will do the rest. He is the man who must go into the tedious details. He must not confine himself to generalities, but must be specific. He must determine the manner in which the property shall be developed. What equipment will be necessary? How much money it will take to do this, and how long and, finally, what results are to be expected, and when?

These are all very important points with investors and boards of directors, so far as my experience goes, and it is the engineer who must be prepared to answer them.

He has not the time to theorize concerning the genesis of the material to be mined. He sees the conditions existing as nature has left them, and he has to use all his knowledge and experience in deriving every advantage possible from these conditions, and in overcoming obstacles that he may find. Thus, to quote one of our ex-Presidents, he is confronted by "a condition and not a theory." I have never yet served a company or individual who did not take much more interest in a statement of the dollars and cents required to open and equip a mining proposition, the length of time necessary to put it on a paying basis, and the size of the dividends which would accrue from this investment, than in the most learned and scientific dissertation upon the geologic phenomena.

After the engineer has settled upon his methods and plans, and is ready to go ahead with his development, it is time for the practical miner to come in. He should have charge of the men working upon this development, and should always be subordinate to, and receive instruction from, the engineer in charge. He will, of course, be consulted frequently in regard to the minor details; but the engineer should be paramount, thus avoiding divided responsibility and divided authority, which has ruined many a good mine, and also many good men.

The engineer should alone be responsible, and if he understands his business thoroughly, and gives it the proper attention, the operation is bound to be successful; if he does not understand his business, or neglects it, he will fall by the wayside.

WILLIAM M. GIVEN.

Birmingham, Ala., June 17, 1903.

ELECTRIC DRILLS.

The Editor:

Sir.—I have noticed in your recent issues some discussion in relation to Electric Drills.

Without going into the technical side of the question I venture to give you some of the practical difficulties which I have encountered in their use during the past few years.

Some five years ago the Marvin drill, which Mr. Magenau mentions in his letter to you of May 24, was brought out and given a very fair trial in Colorado, but failed to give satisfaction; nor have any recent improvements in this drill qualified it to be accepted as a machine which is suitable for every-day use in metalliferous mining. Three years ago Mr. E. G. Stoiber, owner of the Silver Lake Mines at Silverton, Colorado, after a very thorough investigation of electric drills—which investigation covered a personal visit to the mines in Germany—introduced the Siemens-Halske drill at his property. In order to give this drill a test he employed a German mechanic thoroughly versed in its use, and brought him over to this country, together with a very complete equipment of drills, motors, etc. I visited this property on purpose to see these drills at work, and my observations convinced me that they were not suitable for the work which was demanded of them. The chief trouble seemed to be the difficulty in keeping the drill in repair, under the hard usage which it received. Where labor and material are at a maximum figure, the expense of keeping these drills in repair was too heavy. It is the custom abroad to have a number of drills in the repair shop in the hands of expert mechanics, as they must be kept in perfect order to be efficient. It seemed also that in the stopes it was difficult to use them, as the motor-box and flexible shaft required an adjustment, which it was well-nigh impossible to attain. The motor-box must be, of course, nearly level, and the flexible shaft kept at a proper angle with the drill. The drill also requires very careful handling, as it is a delicate machine in comparison to the ordinary air drill.

There have been several modifications of the Siemens-Halske machine. The difficulty of converting the rotary motion into a reciprocating one efficiently is a serious problem. The Denver Engineering Works have made the motor-box a part of the drill, but, of course, they have a number of difficulties to overcome which are inherent in machines of this description. I followed up this experience by making a trial of several types of electric drills in the Smuggler-Union Mine at Telluride last year; they were not satisfactory.

To sum up: From my experience, to date, with electric drills I have failed as yet to find one which can replace the air drill for every-day use in metalliferous mining. It is the hope of all who are engaged in mining, especially in the higher altitudes, that an electric drill will be perfected; its field of usefulness is manifest. I should hasten to install them.

BENJ. B. LAWRENCE.

New York, June 19, 1903.

A LARGE NUGGET.—According to the *Demerara Chronicle* of Georgetown, British Guiana, a gold nugget weighing 31 oz. was recently found at the Jimbo placer, Barima District, the property of Craigen & Forbes. In this district gold is mostly found in nugget form, for which reason the highest market value is given in exchange for it. It is near Jimbo, three days above Five Star Landing, that the record nugget was unearthed in the fall of last year.

DUSTY SHOTS AS A FACTOR IN COAL DUST EXPLOSIONS

BY HENRY S. MUNROE.*

We may assume that a successful blast in a mine, where the coal is shot from the solid, will displace about six tons of coal. Of this we may estimate that at least two tons will be slack, passing through bars 1.25 ins. apart. Of this slack coal fully 2 per cent, or 80 lb., will be dust, say less than 0.01 in. Each pound of dust will contain, say, 75 per cent of combustible matter, carbon and hydrogen, and will require about 125 cub. ft. of air for its complete combustion. Eighty pounds of dust will then make with 10,000 cub. ft. of air an explosive mixture. A single shot may thus convert a room 20 ft. wide, 5 ft. high, and 100 ft. long into a huge cannon, threatening the safety of the whole mine and requiring only the flame of a blown-out shot to fire it. A larger blast, or one more heavily charged with powder, may make two or three times as much dust, and in combination with a blown-out shot produce an explosion of great violence.

A pound of powder has roughly one-third of the explosive energy of a pound of coal dust mixed with air, assuming the combustion to be complete in each case. Thus the 80 lb. of dust from a single blast with favorable conditions may produce the destructive effect of about 10 kegs. of powder. A larger blast, or a more dusty shot than the one assumed, may easily equal 20 kegs, even if the combustion of the dust is incomplete.

That the above ideas have a foundation in fact is evident to any one familiar with the "windy-shots," so-called, which are of almost daily occurrence in the coal-fields of Indiana, Illinois, Iowa, Kansas, and other States, where blasting from the solid is practiced. These windy shots are undoubtedly small dust explosions, brought about by heavy blasting. In many cases these windy shots have caused serious accidents and loss of life.

The writer, as a member of the shot-firers' com- of mines in which these windy shots occur, and has obtained evidence from miners, shot-firers, and mine bosses as to numerous shots of this character.

In one case in the Princeton Mine, Gibson County, Ind., a heavily charged hole drilled 6 ft. into the solid in a tight corner, blew out a triangular wedge of coal, possibly two or three tons, and produced a windy shot that traveled about 750 ft., burning severely the miner responsible for the blast. The entry was a new one and the room but 36 ft. long, so that but little dust had accumulated. The mine is a dry one and makes some gas, which perhaps contributed to the force of the explosion. The fact that so violent a windy shot in a dry mine extended no farther, suggests that the bulk of the dust came from the blast itself. I estimate that the shot as fired must have produced not less than 100 lb. of dust, quite enough to account for the effects observed.

A windy shot, in a new entry, in the Willow Grove Mine, in Vermilion County, killed two shot-firers in August, 1902. This dust explosion probably resulted from a combination of dusty shots fired in rooms along the entry. One shot-firer was caught by the flame as he was going through a curtain near the end of the entry. The other was overcome by the after-damp. The distance was not obtained in this case, but was over 300 ft. These men had experienced many such windy shots and had become reckless. Several windy shots have since occurred in this mine, but without causing injury to the shot-firers. A blower of gas, perhaps 10 cub. ft. per hour, was seen in a room on this entry, but this amount is too small to be considered as contributory in any way.

The shot-firers have generally learned to protect themselves from these windy shots by retreating to rooms off the entry, or off a parallel entry and waiting there for the flame to go by.

In Brouillet's No. 3 shaft, also in Vermilion County, we obtained from the shot-firers particulars of two windy shots that occurred Wednesday and Thursday, May 20 and 21, 1903, the week before our

* Professor of Mining, School of Mines, Columbia University, N. Y.

visit. One of these was so severe as to be evident at the surface, and caused the summoning of a rescue party, who went down into the mine only to find the shot-firers continuing their work as if nothing unusual had happened. These windy shots occurred on the sixth north cross entry, 900 ft. or more west of the shaft.

The explosion of Wednesday night was caused by a shallow rib shot in the tenth room on this entry. This shot had a line of resistance of 6 ft., which combined with its small depth, not over 5 ft., produced a blown-out shot. The flame from this shot was seen by the shot-firer who stood near the mouth of a room near the main entry, 250 ft. or more away.

The explosion of Thursday night, which made itself evident at the top of the shaft, was in the fourteenth room on the same entry. This was caused by a cutting-out shot 5 ft. deep, with a line of resistance about 6 ft. The upper part of the hole was in coal that had been shaken by a previous blast. About 1 ft. of this loose coal was blown out, creating a flame that traveled by a "break through" into entry No. 5, and through the main entry toward the shaft, the effect being seen at the surface, a total distance of nearly 1,500 ft. The shot-firer was near the face of a room on the fifth cross-entry. The floor of the break-through the sixth and fifth entry, was swept clean as with a broom. Both entries are dry and dusty. The mine makes a little gas at times in small blowers. A trace of gas was seen at one place in another part of the mine, just enough to flash in the mouth of a drill hole. A small gas explosion occurred in this mine about a year ago, when a portion of this west entry was flooded and the ventilating current cut off.

These two windy shots were undoubtedly dust explosions, the gas present, if any, being in too small amount to have appreciable effect.

The shot-firers state that windy shots are of common occurrence in this mine, but up to the present time no one has been hurt. The shot-firers often feel the effects of the after-damp, from these explosions, and from the symptoms given it is probably that white-damp (carbon monoxide) is produced in some quantity. Following the heavy explosion of Thursday the after-effect of gas poisoning in the case of one of the shot-firers, lasted 24 hours or more.

Not to multiply examples, similar windy shots were reported at every one of the ten coal mines examined. The flames of these windy shots have been seen by the shot-firers from their places of refuge and by others at distances varying from 60 to 675 ft., while damage has been done by the concussion of air at 1,500 ft.

In some of the mines visited no trace of gas had ever been seen, and none could be detected by a Pieler lamp at the time of our visits. Windy shots, however, are reported at these mines as well as at the mines where gas is known to exist. With one exception—the Princeton Mine in Gibson County—the amount of gas in the ten mines visited is so small as to be negligable as a factor in these dust explosions.

On January 24, 1902, an explosion of this character occurred at the Lost Creek No. 2 Mine, Oskaloosa, Iowa, killing 20 miners out of 110, and injuring many more. From an account of this accident published in March, 1902, it appears that the explosion had its origin in a room about 500 ft. northwest of the shaft. Here a 5-ft. hole, with a burden of 4 ft. 10 ins., had been fired once before without result. In addition, a 2-ft. hole at right-angles to the 5-ft. one, had been fired previously without dislodging the coal. This hole prolonged 7.5 ins. would have intersected the 5-ft. hole about midway. The mine is dry. The roadways were clean. No gas in the mine. On firing the 5-ft. shot the second time the coal around the mouth of the hole, loosened by the previous blasting, was blown out. The flame from this blast traveled through the entry to the shaft, and dust and debris were hurled many feet into the air at the shaft mouth, a total distance of over 600 ft. Assuming that the greater part of the coal blown out was slack, this blast should not have produced over 30 or 40 lb. of dust, so that in this case it is probable that the explosion owed some of its force to dust from the dry roadways.

A commission was appointed shortly after this accident by the Governor of Iowa to investigate the subject of mine explosions. In the report of this commission it was stated that the greater part of the explosions in the State are due to shots fired a second time, or to shots fired in coal shaken by previous blasting. (The dust explosion of May 21, at Brouillet's No. 3, above described, was produced by a shot of this kind.) The theory was advanced that the gases from the powder of the first blast remain in the coal, and contribute to the force of the subsequent blast! It seems simpler to suppose that the coal, weakened by previous blasting, was pulverized by the final blast with the production of an unusually large proportion of dust. Further, the line of greatest weakness in such cases would be at the mouth of the hole, in this loosened material, so that a combined blown-out shot and dusty shot would result, and the flame and burning powder would traverse and explode the dust thrown out at the same time. A blast of this character might easily produce enough dust to cause a very serious explosion.

In this connection, as showing that dusty shots may be dangerous even in wet mines, the dust explosion in January, 1898, at Mt. Carmel, Kansas, is of interest, and has not received the attention that it deserves.

The testimony taken in this case was published in full in the report of the Kansas State Mine Inspector for the year ending December 31, 1897. The testimony shows that the entries were regularly watered, so as to be wet all the time, and, further, that the coal itself was so wet as to require the use of cartridges for the shots; in many cases the hole being left to be loaded and tamped by the shot firers. Such a mine would generally be considered safe from danger of dust explosions. In spite of these conditions, three shots in one room, fired by squibs nearly together, created a dust explosion that "completely wrecked the mine as to overcasts, stoppings, and doors for a radius of 750 ft.," damaged the headframe and shaft timbering so that the cage could not be used, and wrecked the fan-house. Six shot-firers were in the mine. One was killed 264 ft. from the room where the shots were fired, two others died from after-damp, two were rendered unconscious, and one only escaped without harm. If there had been 200 miners underground, as would have been the case had the men been required to fire their own shots, few would have escaped alive.

From the above instances it is evident that dusty shots, in combination with blown-out shots, constitute a very important factor in dust explosions, and must be taken into serious consideration in devising means for preventing such explosions.

Previous investigations have laid much stress on the presence of fire-damp in the air of the mine, and on the presence of dust in the roadways and working places, as the prime factors contributing to dust explosions. To this must now be added the dust and explosive gases produced in blasting. In many of the instances cited in this paper, gas was undoubtedly present, but in most cases, in Indiana at least, gas occurs in the mine workings in such minute percentage as to be negligable. We have, however, in all cases a notable amount of inflammable gas in the powder smoke, which gas undoubtedly plays a very important part in producing dust explosions. The blasting powder used in our coal mines contains about 70 per cent of soda niter. A pound of this powder will produce about 4 cub. ft. of gas, of which, say, 15 per cent[1] will be carbon monoxide, marsh gas and hydrogen. An ordinary blast, say, 5 lb. of powder, will yield enough of these gases to add 0.25 per cent explosive gas to 1,200 cub. ft. of air. Experiments have shown that 0.25 per cent of gas in the air of a mine will have marked effect in aiding dust explosions. If several large blasts are fired in a room the powder smoke produced will then add an element of serious danger, not to be overlooked. In most of our Western mines, the gas from powder smoke is of far more importance than the small amount of fire-damp likely to be present. It must not be overlooked, however that carbon dioxide is present in the powder smoke in much larger percentage than the inflammable gases, and to some extent offsets and neutralizes them. From this standpoint we may perhaps explain the greater margin of safety shown by blasting powder containing large percentages of niter.

The presence of dry dust in rooms and along the entries is a well known source of danger. A dust explosion, once started, gathers fresh explosive material as it sweeps through the mine workings, and the extent and destructive force of the explosion are much increased thereby. The lightest and most dangerous dust finds lodgment on the upper side of the timbering and on the slate piles in rooms and entries, and on the walls, and even adhering to the roofs, of the mine workings. The occasional sprinkling of the roadways at infrequent intervals, as is usual, is therefore ridiculously insufficient. The Mt. Carmel explosion occurred in a mine, in which the entries were regularly sprinkled. To be efficient, the water should be so applied as to reach the dust, and wet it thoroughly, wherever it may happen to lodge. Even the most effective wetting of the dust in rooms and entries will not prevent dust explosions originating from dusty shots, but may tend to limit their extent and lessen their force. It is, however, not impossible that the intense heat of a dust explosion may, in some cases, vaporize the water in the wet dust, suddenly, and with sufficient energy to throw the dust into the air, and thus extend the explosion into and even through the watered area.

It remains to be seen whether water can be used in any way to lessen the danger from dusty shots. In some cases it may be practicable to force water under pressure a few feet into the solid coal, using the blast holes for this purpose before loading and firing them, as in the Saar District in Germany. Or larger areas of coal might perhaps be water-soaked in advance of the workings by bore-holes drilled from the surface. When this can be done effectively and economically, it may prove of service. In most cases, however, it is likely that the water, if it penetrates the coal at all, will follow the cleavage planes and joints only, and leave the solid coal as dry as before. The Mt. Carmel explosion, in which dust was produced from coal so wet as to require the use of cartridges in blasting, and to make it desirable to leave the loading and tamping of the blasts to the shot-firers, seems to indicate that but little gain is likely to result from any attempt to wet the solid coal before blasting.

In Great Britain, and on the Continent, it has been attempted of late years to lessen the danger from blown-out shots by the use of special safety explosives in the place of ordinary blasting powder. The list of "permitted explosives," issued from time to time by the Home Office, in Great Britain, includes a number of ammonium-nitrate powders, certain special dynamite mixtures, and a few blasting powders with large percentages of potassium nitrate. Recently the tests have been made more rigorous, and a new "special list" has been substituted, many explosives, formerly "permitted," now being considered as too dangerous for use. Recent experiments in Austria and Germany have resulted in condemning many explosives still allowed in English coal mines. Experience gained in the use of these so-called safety explosives indicates further that explosives which may pass the small scale tests in the governmental laboratories may prove to be dangerous when fired in larger quantities in the mines.[2] An explosive which is absolutely safe has yet to be discovered. Whether the greater margin of safety afforded by the use of these special explosives is sufficient to warrant their general use, remains to be proved. The fact that the subject is attracting universal attention in all civilized countries, the United States alone excepted, suggests the

[1] The gases from blasting powder tested by Nobel & Abel contained nearly 42 per cent of CO, CH_4 and H, but this powder contained less than 62 per cent of potassium nitrate.

[2] See recent experiments at Gelsenkirchen, *Gluckauf*, May 9, 1903. London *Colliery Guardian*, May 22, 1903.

importance of inaugurating experiments here also, and it would seem desirable that the mine operators should take up this matter, with the manufacturers of blasting powder, and seek to increase the margin of safety in the explosives used, by such modifications of composition as may prove practicable. If the matter be neglected there is danger that some explosion, attended with more than usual loss of life, may focus public attention on the use of explosives in coal mines, and perhaps lead to hasty and ill-advised legislation on the subject.

The most important line of action, however, is to put an immediate stop to the reckless and extravagant use of powder that has developed in the past two or three years. Except in machine mines, but little shearing or undercutting is now done, and the coal is obtained by the free use of powder. Blown-out shots are frequent, and so-called windy shots are of almost daily occurrence. These windy shots are in most cases true dust explosions, and have only to occur on a somewhat larger scale, or when a large number of men are present in the mine, to produce appalling mine catastrophes. No possible human foresight can make coal mining absolutely safe, and dust explosions may occur even when all known precautions have been taken. No coal operator, mine official or miners' organization can afford to take the grave responsibility of ignoring the repeated warnings given by these windy shots, which show that the danger is real and imminent.

In 1899 a blasting law was passed in Indiana which makes it unlawful to drill a blast-hole more than a foot deeper than the cutting or "loose end," or with a greater burden at the end than 5 ft., or with more than 8 lb. of powder. Similar laws exist in other States. Such laws may make it practicable to punish careless and reckless men, and so prove a valuable aid to the mine management, but such laws, even if they can be enforced, will not meet the whole case. No possible law, or set of laws, will instruct an inexperienced miner, or give him good judgment in pointing his blast-holes, or teach him how much powder to use. A blast-hole may be legal, and yet exceedingly dangerous.

The recent joint action of the operators and mine workers in Illinois in framing a blasting law and in appointing a commission to determine upon a line of action to prevent the reckless use of powder in the mines, opens the way for similar co-operation between the miners and the mine officials in that State.

By concerted action of the sort indicated, much better results will be secured than by legislative interference. The blasting law of Indiana has remained a dead-letter up to the present, and the Illinois law will be of little value, unless operators and miners determine that it must be enforced, for their mutual protection, and for the best interest of all

POWDERED ALUMINUM FOR EXPLOSIVES.

According to the *Metal Industry,* powdered aluminum has quite recently been introduced into the field of explosives and a mixture of this material and nitrate of ammonia is now manufactured under the name of "ammonal." It is claimed that this explosive is one of the safest known and is not subject to explosion from shock or friction, and is reluctant in its burning qualities. The fact that aluminum is not at all acted on by nitric acid, renders the explosive particularly free from spontaneous decomposition. Not being affected by frost, the results so often followed in the thawing of frozen nitroglycerine (dynamite) products are not to be feared. The firing is done with the usual percussion cap. Moisture is said to have no effect on it, an interesting feature, if so, because nitrate of ammonia is readily susceptible to such influence.

This explosive possesses many interesting features. For instance, by varying the amount of powdered aluminum the strength of the explosion may be varied. The gases resulting from the explosion are also said to be harmless. This, of course, is of great importance in mine blasting. Another feature is its not exploding when a shock is imparted to it. Cases are cited where shells of it were fired through thick steel plates without any result other than compressing it. The usual percussion cap then was tried with the result of producing the customary explosion.

THE COPPER DEPOSITS OF THE BEAVER RIVER RANGE, UTAH

By HENRY M. CROWTHER.

Copper Mountain, 7,600 ft. high, at the southern end of Beaver River Range, is a prominent peak of white limestone forming the crest of the range, and surrounded by deposits of copper ores as yet but little developed. Four miles south of Copper Mountain, and at the base of it, are the main copper mines of the region.

In structure probably three-fourths of the range is composed of eruptive rocks. This fact renders the study of the region difficult, for the original up-lift was accompanied by intrusions at successive periods, of igneous rocks, leaving but island-like masses of sedimentary strata in a sea of geological confusion.

The igneous rocks of the region include monzonites, rhyolite, mica and augite, andesite and diorite; of these rocks the monzonite varieties mentioned seem the most closely related to the copper mineralization.

Copper Mountain and Rocky Spur show evidence of being the opposite limbs of an anticline with a subsided crest between, though great erosion and subsequent disturbance have combined to bring about the conditions as they are at present. A true granite forms the core of this fold and appears at surface towards Copper Mountain.

The sedimentaries remaining are of the Paleozoic series; Cambrian quartzite and Carboniferous limestone predominate. The limestone occupies the most elevated position, with quartzite next and the monzonites the lowest (excepting the granite). This rule holds good in nearly all instances, and as the copper mineralization occurs in or near the monzonites, the copper mines of necessity occupy the lowest ground adjacent to the quartzite or lime.

Thermal spring activity has been general, large surface crusts of porous calcite several feet thick exist; cementation by iron water is also common, making masses of iron-cemented breccia; but the flow of copper waters is clearly apparent in a few instances only.

The ore-veins are of three distinct kinds: 1. Fractures wholly contained in igneous rocks. 2. Shear zone fissures at igneous-sedimentary contacts. 3. Typical contact deposits, mostly in lime, with or without porphyry wall.

The first variety are generally contained in the monzonites and are fairly persistent; they appear to be fillings along flat thrust-planes rather than mere vertical contraction cracks or fissures caused by the cooling and shrinking of the once plastic rocks. The feature of these veins is that of secondary ores of copper and seams of bornite at surface, also considerable calcite associated with the quartz gangue. There are hundreds of acres of this rock profusely seamed with copper minerals in joint planes, large masses of which carry about 1 per cent copper, with an occasional fracture vein (with 40° to 60° dip) containing from a few inches to several feet of copper ore. These veins occur in parallel series with northeast and southwest strike. This particular belt of mineralized material lies between the other two varities of veins, and is over half a mile wide as proven to date. Its strike is east and west, and it is somewhat stratified, with flat dip to the south.

The second class of veins are best illustrated in the O. K., Blue Acre and other deposits. These show no sulphides at surface, but have exposed masses, best expressed in acres, of copper carbonates in blue and green spotted ores in an igneous gangue, with quartz and sparse iron filling. These deposits are usually overlaid by massive quartzite containing much oxidized iron at surface. They show upthrust movement. The strike is a little south-of-west and north-of-east. The fissure dips to the north, though the ore-bodies are in the foot-wall of the fissure; because, no doubt, the quartzite resisted metasomatic action. Laccolitic influence with subsequent denudation of overlying strata would account for this class of deposit.

Caves or underground caverns caused by dissolution of country rock, which were partly refilled with oxidized products of iron, copper, etc., exist; a beautiful one was found in the O. K. mine at 150 ft. depth.

The third variety of veins is exemplified in the Montreal property, where there is a mass of chrystalline calcite impregnated by copper. Mineralized jasperoid, also magnesian silicates (fibrous talc or asbestic material) all containing copper, are features of this belt.

The region includes a great extent of most promising lime-contact, as yet unexplored, some of which contains lead ores.

Bodies up to 16 ft. wide of peacock copper ores, averaging fully 40 per cent copper with $6.50 in gold-silver per ton, as mined, have been opened up in the O. K. Mine, and the average ores of the region may be stated at 6 per cent copper. In mining 6 per cent ore there will be developed a large tonnage of 2 to 3.5 per cent ore, which under normal conditions will afford a concentrating material, as silica is largely in excess of the iron content. The fact that the ores generally contain gold and silver values enough to defray the cost of obtaining the copper is significant. The gold value of ores is somewhat in excess of the silver. The horizontal axis of the ore shoots is generally greater than the perpendicular.

Oxidation of ores in the larger deposits is complete down to 100 ft., where the zone of secondary enrichment begins, as marked by bornite and chalcocite; the copper carbonate ores, however, continue to at least 400 ft., in conjunction with the sulphides. The carbonate ores contain but little iron. Silicates of copper are not uncommon, while some native copper exists, but it is not an important ore. Arsenic and zinc are not evident, but there is some promise of nickel. Molybdenite occurs in increasing quantities, associated with white quartz, in connection with the copper ores. Chalcopyrite is the main copper-bearing ore of the region, though oxidized ores are too important to avoid, but are too siliceous to smelt alone.

Shaft-working is required in the region, but no water of consequence has yet appeared, nor is any likely to be encountered until greater depth is attained.

That the Beaver County District is destined to maintain a large production of copper is the well-advised opinion of all who studied the region, and it is also conceded that economic conditions admit of an unusually low cost of production.

LAKE SUPERIOR MINING INSTITUTE.

The following circular has been issued by Secretary A. J. Yungbluth, from his office at Ishpeming, Michigan, under date of June 12: "By vote of the Council it has been decided that the eighth annual meeting of the Institute be held on the Marquette Range, beginning on Tuesday, August 18, 1903. The matter of arrangements is now in the hands of a local committee, and no pains will be spared to make this meeting interesting and enjoyable to members and their guests. Members preparing papers will please advise the secretary of the title, so that due announcement can be made as early as possible, and the papers printed for distribution in advance of the meeting."

GOLD IN TUNIS.—According to the Paris correspondent of the London *Economist,* it is reported there that gold deposits have been discovered in the regions of Sousse and Bizerta. Samples are said to have yielded from 2 to 3 oz. per ton, with a minimum of 0.8 oz. A writer in the *Matin* goes so far as to declare that some specimens obtained near Kairouan have produced in the laboratory a fabulous yield. The Mining Department in the Regency is reported by the same authority to have at first refused to issue permits until it was proved that the gold existed, but is now granting them at the rate of a hundred a day. Some experts in Paris, however, refuse to believe in the authenticity of the discovery.

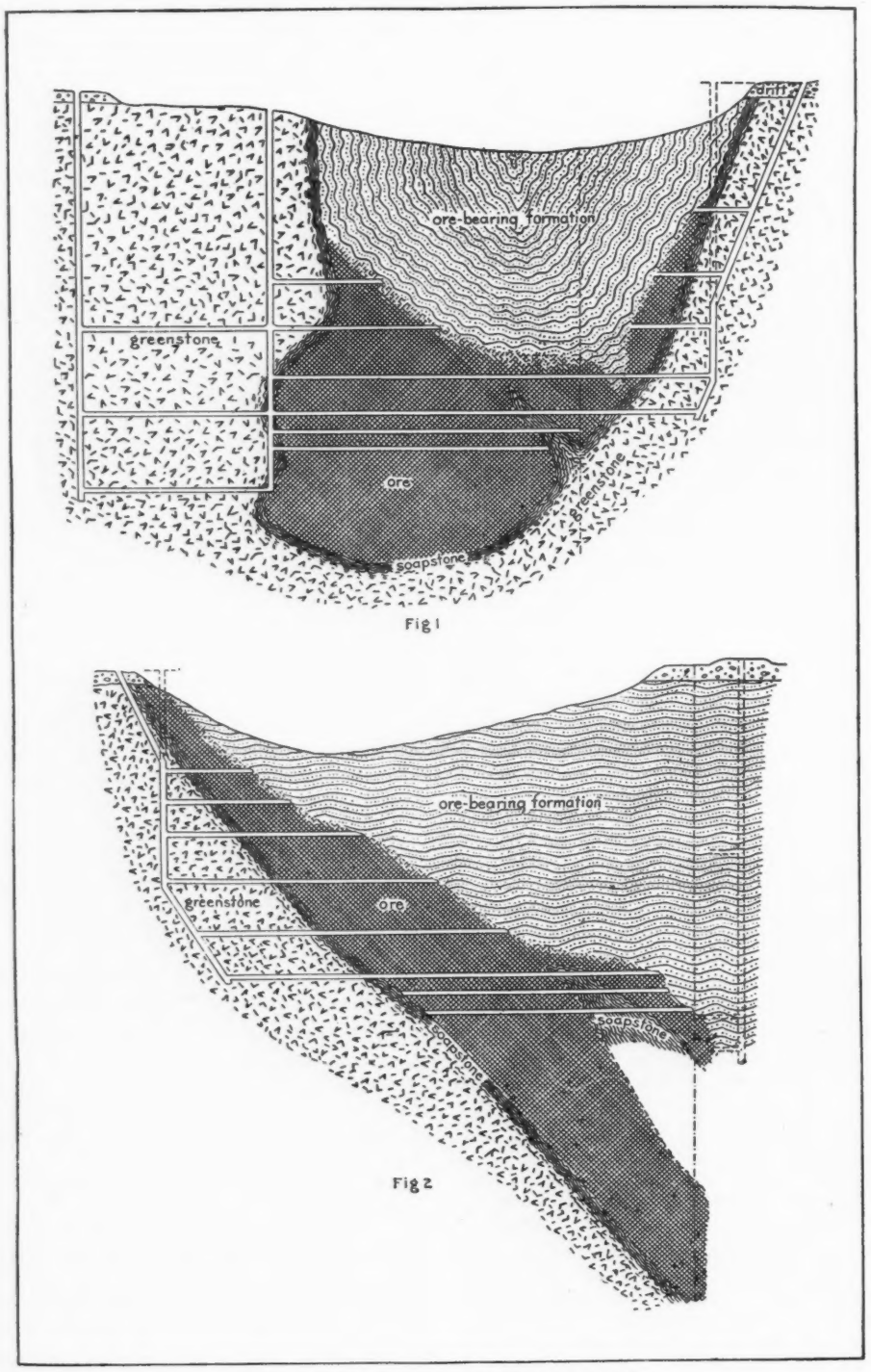
TEST DRILLING ON THE VERMILION IRON RANGE.

By KIRBY THOMAS.

In the JOURNAL for June 13 last the writer described the methods of test drilling adopted on the Mesabi Iron Range in Minnesota. Those methods were especially adapted to the conditions existing on that range, and to the location and surroundings of the iron deposits there. In the present article the methods of testing for ore-deposits on the important Vermilion Range will be considered.

Exploration on the Vermilion Range has been early resorted to in proving up the Vermilion properties. The first diamond drill was used on Soudan Hill by the Minnesota Iron Company about fifteen years ago. Diamond drills had been used a few years prior to this on the Marquette Range in Michigan, but the application of this machine to the work of proving up iron formations was in its beginning. Since that first drill, according to competent authorities, over a million dollars has been expended in diamond drilling on the Vermilion.

The usual depth of the holes is from 600 to 1,000



ORE DEPOSITS OF THE VERMILION RANGE.

many times more difficult than on the Mesabi. The ore occurs in red hematitic jasper, at the bottom and sides of steep pitching troughs, plicated with the greenstone formation. The area of the ore-deposits, which reaches the rock surface, is comparatively small; in some cases they fail to outcrop at all. The largest of the discovered ore-deposits, those of Soudan Hill and Ely, were first discovered on the surface and traced below to depths varying from 700 to 1,000 ft. Owing to the expense of sinking a shaft to such depths, and to the complicated geological structure, the use of the diamond drill was

ft., and when the work is done by contract the prices are from $3.75 to $5 a foot, according to the depth of the hole and the character of the formation. The contract usually is for a complete hole, or no pay. The cost is somewhat less than on the Mesabi. This is partly because of the larger average depth of the drill-holes, but chiefly because the firm jasper, although very hard, is not so destructive to the carbons as the broken taconite of the Mesabi.

The Vermilion drilling is all inclined at from 45° to 75° from the vertical. This is done in order to cross the inclined formation at right angles wherever possible. By doing this a better estimate of the true, absolute thickness of the formation is obtained, and the vugs and soft spots which lie parallel to the bedding are crossed at a short diameter. The Vermilion driller has considerable trouble with the soapstone layers, when encountered, and with the vugs in the jasper filled with soft material. The drill-rods often have a perverse tendency to follow the softer layers. One notable instance is reported of a hole in Soudan Hill, which came to the surface, much to the surprise of the drillers. The hole was inclined, and in going 700 ft. the drill had curved upward 150 ft., following a soft soapstone layer. The day the drill came to daylight, the drillers had made 80 ft. of progress, and were happy in their ignorance of the course of the drill until the *denoucment*. The vugs cause the loss of many bits, and frequently it is necessary to case them off. On the Vermilion it is customary to case only down to the ledge and 4 ins. farther. For this casing, a 4-in. gas pipe is used, and it is usually driven to the ledge. The rate of progress in the jasper is from 1 to 5 ft., in the hard ore 10 to 15 ft., and in the greenstone 10 to 30 ft. daily.

The separation of the iron from the vein-rock is so distinct that it is usually not necessary to make such frequent analyses of the cores as are required on the Mesabi. However, a careful log of each hole is kept, chiefly for the purpose of making out the geological structure in connection with the areal mapping and other drill records in the vicinity. The Minnesota Iron Company marked each hole when complete by plugging it with a steel rail with the number and other marks chiseled on the flange. These unique monuments dot the iron range in places like the stumps of a grove.

On the Vermilion the "E" bit is chiefly used, with a clearance for the carbons of 1-64 in. Six stones are usually set in the bit. The Sullivan drill is chiefly used at present.

The limit of possible iron is supposed to be the greenstone on the diorite, which, according to the geological scheme, forms the basement of the iron-bearing formation. The deepest hole is 1,300 ft. In the mines the diamond drill is advantageously used to put in long holes to break down the backs. A 30-ft. hole, slightly raising from horizontal to give more burden, is run into the ore, and this is used for the blast. The drill is used to some extent underground for exploration in advance of the work.

Before the Minnesota Iron Company was merged with the United States Steel Corporation the work of exploration was in charge of the captain and engineer at the mines, but now it is under the general direction of the exploration division of the Steel Corporation. Mr. W. N. Merriam, for some time connected with the United States Geological Survey in the Lake Superior work, is chief geologist for the company, and directs the exploration. Several firms contract to do work for individual companies. At present most of the exploration is being done about Ely and west of there on Section 30. Five drills are on this property, and several on adjoining properties. The Steel Corporation is drilling near Ely, and at a couple of places between Ely and Tower. This company has several drills at work in the Gunflint Lake country, an eastern extension of the Vermilion, on the Canadian boundary. The location of the Minnesota Mine on Soudan Hill has been thoroughly drilled, and little work has been done in that vicinity in recent years. Ordinarily, the greatest secrecy is maintained as to the results of these tests. Owing to the distinct separation of the ore-bodies in this formation, it is not customary to drill them close enough to estimate the actual mass or the shape of the ore-body. For this reason definite estimates of the reserves cannot be made from the drill tests.

Much of the work heretofore has been without method or without consideration of the geological problem. Speaking of this feature, Dr. C. R. Van Hise, in a Government report on the Vermilion Range, says: "This method, or lack of method, of chance exploration is nowhere better illustrated than

by much of the exploratory work in the Vermilion District. This district is one which, above all others, demands an understanding of the structure, a careful mapping of the ore-bearing and other formations, and a comprehension of the principles of the occurrence of the ores within the iron-bearing formation; for it is a district of almost unparalleled intricacy of structure. The natural consequence of these difficulties is that the chance plan of exploration has been here best exemplified, and the expenditures in exploration in the district have been immense and largely wasted."

Under the Steel Corporation regime the drilling has been on scientific lines. The old miners point to the results, but as to the discovery of new ore-bodies with the diamond drill on this range, the old scheme of hit-or-miss was hardly productive of less discouraging results than the present day scientific work. At any rate, the diamond drill on the Vermilion has yet to bring to light an undiscovered iron deposit. The chief use of the testing, so far, has been to disprove theories and to define the extent of known ore-bodies. For the latter purpose, the results have been very satisfactory.

The accompanying diagrams will illustrate the position of the ore-bodies, and the explanation given above as to the use of the drill. The writer is indebted to a paper by Prof. C. R. Van Hise in the Twenty-first Annual Report of the Geological Survey for these diagrams, and for the following explanations:

Fig. 1 is a vertical north-south cross-section of the Chandler Mine, showing the relations of the ore-deposits to the soap-rock, the Ely greenstone and the ore-bearing formation. The iron ore is in a broad U-shaped trough bottomed by soapstone, or paint-rock, which grades down into greenstone. It is capped by the ore-formation. At the place where the cross-section is made, the ore does not ascend to the surface along either limb, therefore, at the principal place where this cross-section exists, although there is a very large ore-deposit below the surface, at the surface, the only rocks which are found are the greenstone, soapstone and iron-bearing formation.

Fig. 2 is a vertical longitudinal east-west section of the Chandler Mine, showing the same relations as Fig. 1. The section illustrates very well how the ore-body increases in size, from the surface; where the ore reaches the drift, its area is small; and this great ore-deposit, which extends eastward, and there constitutes the Pioneer Mine, is below a heavy capping of the ore-bearing formation.

SOME FACTS REGARDING THE RECENT DISCOVERY OF TIN IN ALASKA.

By Wm. M. Courtis.

One of the many stories circulated regarding the recent discoveries of tin in Alaska, is that the tin-ore contains gold, and that the nodules of iron found with the tin-ore are very rich in this metal, running, so it is stated, into hundreds of dollars.

I have received from various prospectors owning claims at York, also from the engineers sent up by us to make an examination, many samples of the cassiterite and of the iron ore. I made a general sample of the cassiterite and the iron ore representing the various samples, which I assayed. The results showed no gold of commercial value, nothing under 20c. per ton being determined. One sample of tin ore, said to be taken from a vein, ran as follows: Metallic tin, 49 per cent; iron, 3.70; copper, 3.50 per cent.

Recent Government reports seem to confirm the presence of tin on the York Peninsula, in some places in large quantity. Had the practical miners, who came down some two years ago, realized that it is for the best interests of a district that the actual facts be told, capital would now be more willing to aid in the development of what they have. Instead of which, those coming down first so over-estimated the find, and put such a high value on the properties, that the experts sent up to make examination condemned them.

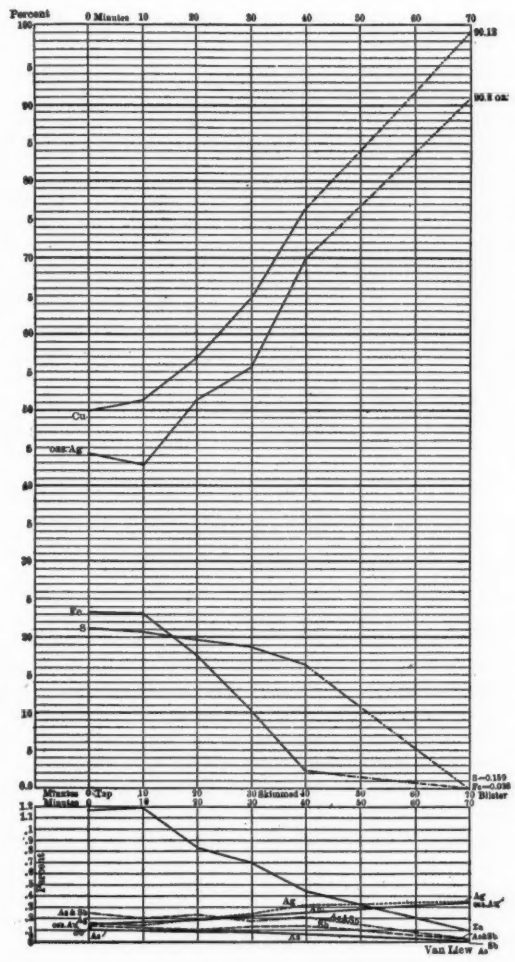
As several companies are reported to be prepared to commence work up there, by fall we should know to what extent this part of the country can contribute to the supply of tin for the United States.

RELATIVE ELIMINATION OF IMPURITIES IN BESSEMERIZING COPPER MATTE.*

By W. Randolph Van Liew.

In determining the relative rate and in finding the point where different impurities contained in copper-matte are eliminated during the process of a converter-blow, the following results were obtained:

A converter was selected which was starting on its second charge. The first charge after lining had finished its copper "hot," and consequently no copper was adhering to the sides of the lining. All the copper and granulated slag from the previous charge were dumped, thus removing any possibility of "salting" the matte to be tested.



ELIMINATION OF IMPURITIES IN COPPER MATTE.

The converter worked fast and well during the entire test. Periods of ten minutes were selected. The converter was brought from the stack to secure each sample of matte to be analyzed, and only that time counted during which air was being forced through the charge.

At the end of 40 minutes' actual blowing, the matte was up to "white metal," the point at which the last skimming takes place; that is, matte of approximately 76.4 per cent copper. From here, of course, average samples of the contents of a converter are impossible, since (from this skimming-point up to finished copper) the contents of a converter consist of constantly varying proportions of matte and copper, which, when a converter is brought from the stack and the blast-pressure turned off, settle according to their specific gravity. When the charge is completed a granulated sample of finished copper is obtained and assayed. Accurate chemical analyses of these equal-period samples of matte and copper gave the following results:

Time.	Cupola-Tap.	10 min	20 min.	30 min.	40 min. Last skim.	70 min. Blister-copper.
Copper, %	49.72	50.20	56.88	64.60	76.37	99.120
Iron, %	23.31	23.15	17.85	10.59	2.40	0.038
Sulphur, %	21.28	20.95	19.74	18.83	16.30	0.159
Zinc, %	1.19	1.20	0.84	0.70	0.45	0.090
Arsenic, %	0.11	0.09	0.08	0.08	0.08	0.0012
Antimony, % ..	0.14	0.12	0.10	0.13	0.13	0.006
Silver, oz.	44.20	42.90	51.40	55.80	70.00	90.800
Gold, oz.	0.16	0.14	0.20	0.24	0.32	0.350

Fig. 1 illustrates graphically the history of their elimination. In this figure, the line of abscissa represents the ten-minute periods of blowing, and the ordinates represent percentages of copper, etc., from 0 to 100. The ordinates of the figures at the bottom are the same, but on a larger scale (from 0 to 1.2 per cent), to show better the impurities in the matte carried to the extent of but a few tenths of 1 per cent. The upper diagram shows that the silver almost parallels the enrichment of the matte in copper.

The lines showing the relative elimination of the iron and the sulphur are the most interesting. For the first ten minutes of the blow, and while the matte is heating up, the iron and sulphur lines are parallel. From this point there is a marked change; the sulphur line is very gradual in its drop, showing that but little is being burned in comparison with what is taking place with the iron, whose line takes a sudden drop. The iron decreases during 30 minutes from 23.15 per cent to 2.4 per cent at the skimming point, while at this point there still remain 16.3 per cent of sulphur in the matte. From this point, however, to blister-copper, it is the sulphur that bears the brunt of elimination, the iron dropping only from 2.4 per cent to 0.0038 at blister-copper, while the sulphur decreases from 16.3 per cent to 0.15 per cent.

This is of great interest, as it shows that, up to the skimming point, it is the oxidation of the iron to ferrous oxide, and the union of the ferrous oxide with the silica of the lining, that affords the source of heat to carry on the operations within a converter; while from the skimming point (76.4 per cent copper) to the finished blister-copper it is chiefly the burning of the sulphur that gives our heat supply to finish the work started by the oxidation of iron.

The zinc, it will be seen, is scarcely affected during the "heating-up" period; while after that its elimination is gradual. The arsenic and antimony, curiously enough, are but slightly affected during the whole of the slag-forming period, or as long as enough iron remains to be slagged off. At the cupola-tap of matte into the converter, the arsenic was 0.11 per cent and the antimony 0.14 per cent, while at the end of the slag-forming period the arsenic was 0.08 per cent and the antimony 0.13 per cent.

When the iron in the matte had been oxidized and slagged off, and then only, did the arsenic and antimony commence to be oxidized and driven off, until, at the point of blister-copper, but 0.0012 per cent of arsenic and 0.006 per cent of antimony remained.

TIMBER SUPPLY.—Prof. B. E. Fernow states that a probably calculation of the present stand of virgin timber in the United States, ready to supply the demand for lumber, although admittedly on a slender basis, brings out the improbability, if not impossibility, of meeting the increasing demand for another 30 years, under present methods of utilization. Even if the entire forest area of 500,000,000 acres were supposed still fully stocked with the average stand per acre, as reported by the census in the holdings of lumbermen—an absurd proposition—the stock on hand would be exhausted within that period. The possibilities of securing the requirements from the reproduction in the natural forest are discussed on the basis of European experiences, and with proper reference to the damaging forest fires. It is shown that even under good forestry practice, the present increasing demand could, from the present area, be supplied only for a limited time. Hence the efforts to secure such forest management and greater economy in the use of timber are not too early, but rather too late, and the dallying with the problem by the legislatures fatal.

* Paper to be presented at the autumn meeting of the American Institute of Mining Engineers.

TESTS FOR CYANIDE SOLUTIONS.*

By J. E. CLENNELL.

In the tests for regulating daily work at a cyanide plant, two of the most important features are (A) titration of cyanide and (B) titration of alkalinity.

(A) *Titration of Cyanide.*—This is universally made by Liebig's well-known method, depending on the fact that when a solution of nitrate of silver is added, drop by drop, to the solution to be tested, each drop of the silver solution forms a white cloud of silver cyanide which disappears on agitation as long as the free cyanide is in excess, the reactions being as follows:

(a) $AgNO_3 + KCy = AgCy + KNO_3$

(b) $AgCy + KCy = KAgCy_2$.

The completion of the reaction is shown by the permanence of a white turbidity or opalescence. As soon as the whole of the free cyanide has been converted into the double silver salt, a further drop of silver nitrate in excess gives a precipitate of silver cyanide which does not redissolve on agitation.

(c) $AgNO_3 + KAgCy_2 = 2AgCy + KNO_3$.

From these reactions it is evident that 169.55 parts of $AgNO_3$ are equivalent to 130.04 parts of KCy.

For testing dilute cyanide solutions, such as are commonly used at the present day, it will be convenient to prepare a solution containing 6.519 grm. $AgNO_3$ dissolved to 1 liter. Every c.c. of this solution is equivalent to 0.005 grm. KCy.

Hence, if we take 50 c.c. (a convenient quantity for dilute solutions) of the liquid to be tested, every cc. of the standard $AgNO_3$ added will represent 0.01 per cent KCy.

The measured volume may be taken by means of a graduated column, or more accurately by a pipette. To avoid all risk of sucking liquid into the mouth, a short length of rubber tube may be attached to the upper end of the pipette. The test glass (generally a small conical flask) should be placed in a good light, and the reaction observed against a dark background. A board rubbed with charcoal answers the purpose very well. It is sometimes convenient to have the burette-stand raised so that the test glass is about on a level with the eye.

The only modification of this method which has been attempted to any extent in practice is the addition to the liquid to be tested of a small quantity of potassium iodide—generally a few drops of a concentrated solution. The addition of this indicator corrects the slight errors due to the presence of caustic alkalis, ammonia, alkaline carbonates, chlorides, ferrocyanides, thiocyanates, thiosulphates, and perhaps some other salts. When zinc is present the result of the titration is considerably modified by addition of potassium iodide, as explained later.

Liebig's method works admirably with pure cyanide solutions, but gives very uncertain and inaccurate results in ordinary working solutions, particularly in presence of zinc. The end point is obscure and indefinite, and is largely affected by the degree of dilution, alkalinity, temperature, rate of titration, and other factors which do not admit of easy correction by the operator. Addition of potassium iodide in the ordinary way, or of ferrocyanide, as recommended by Bettel, do not remedy the difficulty to any appreciable extent.

As, however, it is generally only necessary to obtain relative results, and a knowledge of the real strength of the working solution in actual free potassium cyanide or its equivalent is not essential, the test may be retained with advantage if the following points be strictly observed:

(1) All vessels in use, and more especially the flask in which the titration is made, must be absolutely clean. The change which marks the finishing point is so faint that a very slight film on the glass makes its observation impossible. The flask should be rinsed out at frequent intervals with dilute acid, and afterwards with clean water.

(2) The test should be made always in precisely the same manner. For example, 50 c.c. of the liquid to be tested are measured out with a pipette, 5 c.c. of 1 per cent neutral solution of potassium iodide added, and the mixture titrated with standard silver; no water should be added either before or during the titration.

(3) Turbid solutions may be filtered before titration, but the addition of lime to clarify them is inadmissible, unless a determination of "total cyanide" is to be made. In this case, the liquid must be made strongly alkaline, best by adding caustic soda (with KI), after filtration with lime.

(B) *Titration of Alkalinity.*—Potassium cyanide and other simple cyanides of the same class are alkaline to ordinary indicators. The whole of the alkali metal may be determined by titrating with standard acid, using methyl orange as indicator. With phenol phthalein the end-point is indefinite, owing to the action of hydrocyanic acid on this indicator.

The double cyanide of zinc and potassium is likewise alkaline to methyl orange, but is stated to be only partially so to phenol phthalein.

For practical purposes, however, it is most important to know the alkalinity exclusive of cyanide, as it is this alkali which is chiefly of use in preventing the unnecessary waste of cyanide by reactions due to base metal compounds in the ore, and to the carbonic acid of the air.

This may be done (accurately in absence of zinc) by adding silver nitrate till a slight turbidity is produced, adding phenol phthalein to this turbid solution, and titrating, without filtering, with $\frac{N}{10}$ acid.

This result indicates generally

Equivalent of hydrates in terms of $\frac{N}{10}$ acid

+ Equivalent of half the alkali metal in normal (mono) carbonates, in terms of $\frac{N}{10}$ acid.

The reactions in a typical case are

$KOH + HNO_3 = KNO_3 + H_2O$

$K_2CO_3 + HNO_3 = KHCO_3 + KNO_3$

Bicarbonates are neutral to phenol phthalein, and are therefore not determined. As they have no protective influence they are rightly excluded in estimating alkali for the present purpose.

When zinc is present the results are not accurate; as pointed out by Green[1], the amount of alkali shown is less than the truth, and the solution may even appear acid to phenol phthalein after addition of silver nitrate. Where relative results only are required, the method may probably still be used without practical inconvenience; but the simple modification suggested by Green may easily be applied: to add an excess of a solution of potassium ferrocyanide before adding the silver nitrate.

The precise reactions occurring seem to be somewhat obscure, but the addition of ferrocyanide (in excess) to the zinc double cyanide appears to generate free potassium cyanide equivalent to the cyanogen contained in the zinc compound, leaving the zinc in the form of a complex ferrocyanide of zinc and potassium. When no ferrocyanide is added, however, the action of silver nitrate is to generate zinc nitrate, acid to phenol phthalein, which wholly or partially neutralizes the alkali present.

The alkalinity test may be conveniently made with the same portion of liquid which has previously served for the cyanide titration, as it is of no consequence whether the ferrocyanide be added before or after the silver nitrate. It is better, however, to add the latter in the amount shown to be necessary for titrating "total cyanide," or slightly in excess of this amount.

* Abstract from "Analytical Work in connection with the Cyanide Process." *Proceedings* Institution of Mining and Metallurgy. London, May 21, 1903.

[1] *Proceedings* Institution Mining and Metallurgy, vol. x, pp. 29-37.

PRICES OF THORIUM.—The London *Engineer* says: "During the past year the price of thorium, which is largely used in the manufacture of incandescent gas mantles, has risen very appreciably. Twelve months ago the price was 28 marks per kilogram, but now it is worth 45 marks. It comes chiefly from Brazil, and is shipped to Hamburg, where a corner is being formed."

THE DETERMINATION OF SULPHUR IN COAL.*

By CHAS. W. STODDART.

Standard Method.—About 0.5 gram of coal is forced into a pellet by means of the special press which accompanies the calorimeter. The pellet is carefully weighed in a tarred platinum capsule, and placed in the support which consists of a wire ring fastened to a straight rod. The latter projects through the cover of the bomb. A second rod passes through the cover, parallel to the first, but not touching it. A fine iron wire, coiled spirally in the center, is attached at each end to the parallel rods, and is in contact with the pellet of coal. The cover is now placed on the bomb, which is of heavy steel, platinum lined throughout. A heavy steel flange is set over the cover and screwed down tightly by means of a lever and clamp. A lead gasket in the cover fits over the top of the bomb so that the apparatus is hermetically sealed. In the cover is a valve with a connection for the oxygen tank, in order that the gas under a pressure of 25 atmospheres can be forced into the bomb. After closing the valve and disconnecting from the tank, the bomb is attached by the projecting rods to a row of four 16-c.p. lamps in parallel, giving a current of 2 amperes. When the circuit is closed the lamps flash for an instant. The wire is, of course, oxidized at once when it becomes incandescent from the current, and its melting breaks the circuit. The combustion of the coal is completed. The bomb is disconnected, and a delivery tube of fine bore is introduced into the valve. The other end of the tube is fastened to a U-tube containing hydrochloric acid and bromine water. The valve is opened slightly and the compressed oxygen bubbles through the absorbent solution. If any sulphur dioxide is present, it is thus recovered. Combustion under pressure, however, in all probability converts all the sulphur to sulphur trioxide which is condensed with the moisture on the interior of the bomb. After the gas has been exhausted, the cover is removed, and the latter, as well as the inside of the bomb, thoroughly washed out into a beaker. The residue is filtered off, washed, dried and fused with sodium potassium carbonate. Then it is leached with water, filtered, acidified, evaporated to dryness, and dehydrated, taken up with 1.5 c.c. of hydrochloric acid and 200 c.c. of water, filtered, 10 c.c. of barium chloride added to the warm solution, and allowed to stand over night. There is usually iron present, so precipitation should be completed in the cold, and the solution not boiled at first. The original filtrate from the bomb washings is boiled to expel bromine, 10 c.c. of barium chloride added, and the sulphur determined as barium sulphate. The sum of the sulphur obtained in the filtrate and residue is the total sulphur in the coal. With an average of 580 mg. of coal taken, the barium sulphate in the residue averaged 4.2 mg.

The soft coals press very readily into pellets, but the hard coals do not. The latter were therefore packed into the capsule as tightly as possible, and a small piece of ashless filter-paper fitted over the top to prevent scattering. The coil of wire was sunk in the coal and the ends pierced the paper. In this way complete combustion of the hard coals was obtained.

Although in some cases, especially with coke, mechanical difficulties have been encountered in getting complete combustion, this method is chemically most perfect. The oxidizable sulphur is oxidized under the most favorable possible conditions, and the residual sulphur converted to sodium sulphate by fusion; now if the precaution is taken to dehydrate the silica and to precipitate the barium sulphate under the best conditions, this seems to be the

* Abstract from the *Journal* of the American Chemical Society, vol. xxiv, No. 9, September, 1902.

most reliable method for standard results, though perhaps too long for technical work.

Other Methods.—To compare with the standard method, Eschka's was, of course, chosen as being the best known method for estimating sulphur in coal. A method recommended by Stolba,[1] and unlike Eschka's, was also selected. Atony and Lucchesi[2] proposed a method that they claimed gave better results than Eschka's. It was apparently worth trying. Their original article proposed the precipitation of barium sulphate in a nitric acid solution. This is, of course, impracticable. Dubois[3] copies their method exactly, but substitutes hydrochloric for nitric acid. As an example of fusion methods Thomson's[4] was chosen. Hodgson[5] used sodium peroxide as an oxidizing agent, and it was decided to try his method.

The details of the various methods as used in this work are as follows:

Eschka's Method.—Heath's modification, slightly changed:[6] 1 gram of finely powdered coal is mixed with 1 gram of magnesium oxide and 0.5 gram of sodium carbonate in a platinum dish having a capacity of 75-100 c.c. A crucible may be used. The magnesium oxide should be light and porous. The dish is heated on a triangle over an alcohol lamp. The mixture is frequently stirred with a platinum wire or glass rod, and the heat applied very gradually, especially with soft coals. Towards the end, the bottom of the dish should be at a low red heat. When the carbon is all consumed, the mass is transferred to a beaker and the dish rinsed, about 50 c.c. of water being used. Fifteen c.c. of saturated bromine water are added and the solution boiled for five minutes. The residue is allowed to settle and the clear liquid decanted through a filter; it is boiled a second and third time with 30 c.c. of water, and washed very thoroughly. The residue was not further examined. The volume of the filtrate should be about 200 c.c. One and a half c.c. of concentrated hydrochloric acid are added and the solution is boiled until the bromine is expelled. Now 10 c.c. of 10 per cent barium chloride solution are added to the hot solution drop by drop, and with constant stirring. It is next digested over a low flame, with occasional stirring, until the precipitate settles clear. The barium sulphate is filtered and washed, using a small ashless filter paper, ignited and weighed.

Stolba's Method.—1 gram of finely ground coal is mixed with 1 gram of silver powder and 1 gram of potassium acid carbonate, and the whole carefully heated with frequent stirring until no dark particles remain. The mass is then transferred to a beaker with about 50 c.c. of water and boiled, allowed to settle, and the clear liquid decanted through a filter. Two more portions of water, 30 c.c. each, are added and the solution boiled as before. The residue is now transferred to the filter and thoroughly washed. The filtrate is acidified with 1.5 c.c. of hydrochloric acid and the carbon dioxide boiled out. Ten c.c. of barium chloride are added, and barium sulphate is precipitated as in Eschka's method. In most cases it is found advisable to add a few drops of ammonium acetate solution to prevent a slimy brown residue from running through the filter. It is also frequently necessary to filter the solution more than once to obtain a clear filtrate for the precipitation of barium sulphate.

Antony and Lucchesi's Method.—I gram of finely powdered coal, mixed with 4 grams of manganese dioxide, 1 gram of potassium permanganate, and 2 grams of sodium carbonate, is placed in a platinum crucible and covered with a layer of the same oxidizing mixture. Heat is applied very gradually at first to prevent deflagration of the contents, and is finally raised until the bottom of the crucible is just reddened. After half an hour of such heating the mass is allowed to cool and is then transferred to a beaker with about 50 c.c. of water and boiled. It is now allowed to settle and the clear liquid decanted through a filter. Two more additions of 30 c.c. of water each are made, and the mixture is boiled as before. The mass is finally all transferred to the filter and thoroughly washed. The filter is acidified, and barium sulphate precipitated. In this case two filtrations are always necessary to obtain a clear solution. The addition of ammonium acetate solution helps to a great extent. Manganese dioxide is the cause of the trouble.

Thompson's Method.—One gram of the coal is mixed with 2 grams of sodium carbonate and gently fused until all the carbon is burned away. The mass is then fused and a little potassium nitrate added to complete the oxidation to sulphate. After the mass has cooled it is leached with water, filtered, the filtrate acidified with hydrochloric acid, and evaporated to dryness. The silica is dehydrated, the mass taken up with 1.5 c.c. of hydrochloric acid and about 50 c.c. of water, and filtered. The filtrate is diluted to 200 c.c., and barium sulphate precipitated as usual.

Hodgson's Method.—One gram of the coal is placed in a nickel crucible and covered with 4 grams of sodium potassium carbonate and 1 gram of solid sodium hydroxide. The crucible is covered and heat applied gently until gases are driven off. Then the heat is raised and small amounts of sodium peroxide are added until no further action occurs. Perfect fusion is now obtained with the blast lamp. The mass is allowed to cool, and is then leached thoroughly with water—about 50 c.c. It is then filtered, washed with hot water, the filtrate acidified with hydrochloric acid, evaporated to dryness, the silica dehydrated, and the dry mass taken up with hydrochloric acid and water. After filtering, the sulphur is determined as usual. Only two samples were tried by this method. The results were low, and the method unsatisfactory.

General Precautions.—To avoid possible contamination from gas, alcohol lamps were used throughout these experiments.

All the chemicals were carefully tested for sulphur, and the necessary correction applied, if needed. Sodium carbonate, potassium acid carbonate, hydrochloric acid, and bromine contained no sulphur. Magnesium oxide contained 0.002 per cent; manganese dioxide, 0.004 per cent; potassium permanganate, 0.028 per cent; sodium hydroxide, 0.015 per cent; and sodium peroxide, 0.002 per cent.

Constant acidity was maintained in all the analyses for the precipitation of barium sulphate; namely, 1.5 c.c. of concentrated hydrochloric acid to 200 c.c. of solution.

It was found convenient to add the barium chloride solution from a burette. After the 200 c.c. of acidified solution had been heated to boiling on an asbestos disk, the burette was brought over the beaker and 10 c.c. of 10 per cent barium chloride solution were added drop by drop, stirring all the time. The stirring was continued at intervals after the barium chloride had been added, until the barium sulphate settled clear.

Results.—The results as obtained by these methods were as follows:

Coal.	Combustion meth. Per cent.	Eschka's meth. Per cent.	Stolba's meth. Per cent.	Manganese dioxide meth. Per cent.	Thompson's meth. Per cent.
1	0.67	1.03	0.89	0.67	....
2	0.70	0.73	0.65	0.58	0.59
3	0.82	0.80	0.81	0.79	....
4	1.65	2.02	1.64	....	....
5	0.51	0.58	0.51	0.52	....
6	0.67	0.91	0.62	....	....
7	0.64	0.61	0.60	0.60	0.55
8	1.21	1.20	1.15	....	....
9	0.70	0.70	0.62	....	....
10	1.99	1.71	1.75	....	....
11	3.09	2.93	3.08	....	3.08
12	0.65	0.65	0.65	0.64	0.67
13	2.23	2.20	2.05	....	....
14	1.21	1.12	1.07	....	....
15	1.35	1.85	1.34	....	....
16	0.53	0.51	0.38	0.50	....

An examination of the variations shown in the results tells its own story.

[1] Listy, "Chemike," vol. 12, p. 203.
[2] *Gazzetta Chimica Italiana*, vol. 29, p. 181.
[3] *Bulletin Association Belge des Chimistes*, vol. 15, (6), p. 225.
[4] *Journal* Society Chemical Industry, vol. viii, p. 526.
[5] *Journal* of the American Chemical Society, vol. xx, p. 886.
[6] *Journal* American Chemical Society, xxi, 2127.

ASPHALT ROCK IN KENTUCKY.*

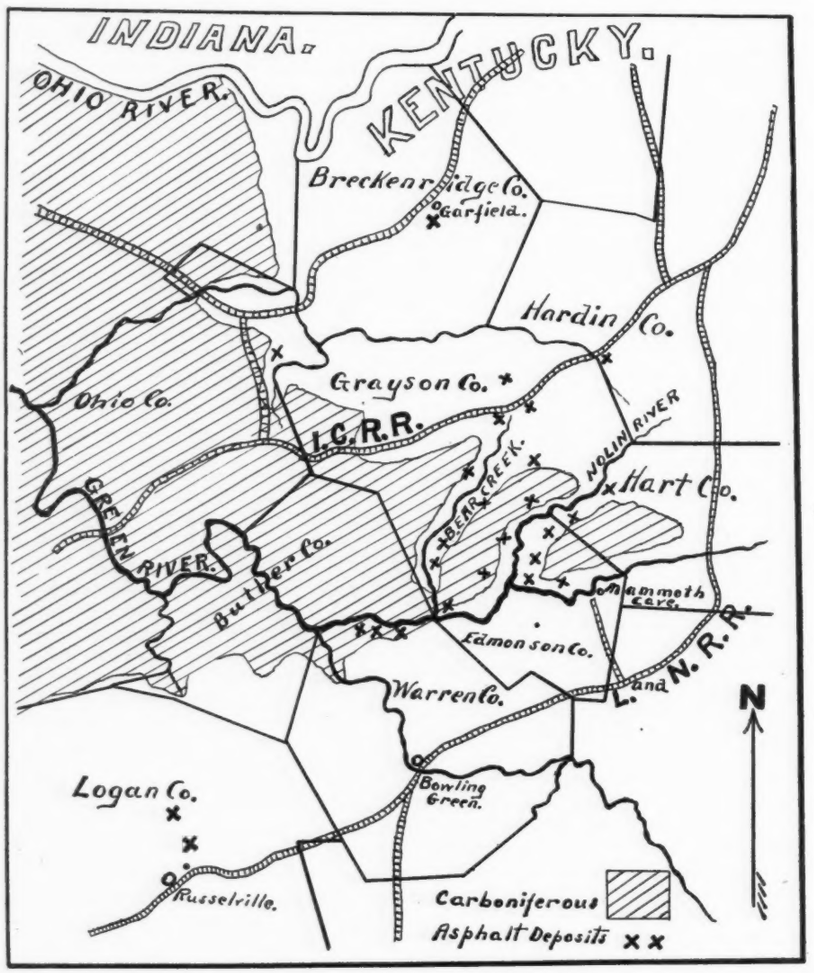
By William E. Burk.

The deposits of bituminous sandstone or asphalt rock in Kentucky occur chiefly in the counties of Logan, Warren, Edmonson, Butler, Grayson and Breckinridge, occupying a strip in the central part of the State that extends from Breckinridge County on the north to Logan County on the south. A few deposits are found also in the western parts of Hardin, Hart and Larue counties. The asphalt-bearing territory apparently follows the line of the coal measures, and is about 20 miles wide by 50 miles in length. The main basin of highly mineralized rock is located well to the south, the richest deposits being found in Logan and Edmonson counties. A bituminous deposit also exists in Carter County, in the northeastern part of the State; the material is impregnated sandstone, but it appears to lie in a basin altogether different from that which extends into West Virginia, and portions of which are found scattered over other eastern counties of Kentucky. The deposits occur in fine-grained sandstone of the Sub-Carboniferous formation. The strata usually approximate their normal horizontal position, and from geological evidence, it is probable that the bituminous or asphalt material represents the residual matter from pre-existing petroleum beds. The soft, porous sandstone, which once was saturated with petroleum, has been eroded away, and the channel streams of ancient rivers have cut deeply into the rock. This has resulted in valleys and hills of sandstone from which the lighter products and oil have distilled and drained away, leaving residual petroleum products constituting the asphalt or bitumen. The fact that petroleum-bearing rock formerly existed where the present asphalt rock occurs should not be taken to mean that quantities of petroleum must occur at lower depths, for the underlying strata may represent altogether different formative conditions. The bituminous deposits, though quite generously distributed in Grayson and Edmonson counties, are in no sense uniform as to richness and magnitude. The horizontal ledges vary in thickness from 2 to 20 ft. In many cases the deposits are quite lean; the material locally called "black-rock" contains only a small percentage of bituminous material, and has no commercial value. The known deposits of commercially valuable material are few. The richer deposits are usually enclosed by strata of "black-rock" from 1 to 2 ft. in thickness, while the intervening portion of asphalt ledge varies from 3 to 15 ft. in thickness, and contains from 5 to 15 per cent total bituminous matter. When containing under 4 per cent the material passes under the class of "black-rock." Deposits containing as high as 20 per cent are of small extent, and usually due to local concentration conditions. Of the total bituminous content about 20 per cent is of the nature known as asphaltene, and 80 per cent of petrolene. After the removal of the bituminous matter the sandstone crumbles to a very fine sand. One characteristic sample upon examination showed 8.5 per cent of sand that passed through a 150-mesh, and 82.5 per cent that passed through a 75-mesh sieve. In the present state of development only those deposits lying conveniently near railroads or river have received attention, and of such only those have been worked which offer the least difficulty in the way of uncovering. Although rich material is sometimes exposed in bluffs, no tunnelling or drifting has been attempted. This district is entered by the Green River and its prominent tributaries. Considerable asphalt rock has been moved by barge to Ohio River points. The Green River Asphalt Company, operating near Young's Ferry, on Green River, has shipped its product to Evansville, Ind., by barge, and from there by rail, but recently the company changed its policy, and is now shipping to Bowling Green by water. The field is reached by two railroads, the Illinois Central Railroad crossing the field at the north, and the Louisville & Nashville Railroad passing in a southerly direction to the east of, and finally

* From advance sheets of "The Mineral Industry," vol. xi, now in press.

crossing, the Logan County deposits at Russellville, as shown in the accompanying map.

Among the incorporated companies owning or controlling deposits are the American Standard Asphalt Company, the Green River Asphalt Company, the Breckinridge Asphalt Company, the Federal Asphalt Company, the Natural Asphalt Company, and the National Rock Asphalt Company. The only companies owning property that is developed to any extent and equipped with mining plants are the American Standard Asphalt Company, the Green River Asphalt Company and the Breckinridge Asphalt Company. It is the policy of these companies to mine material as needed, no considerable quantity or rock being carried in storage. This occasions quite irregular production. The total output during



KENTUCKY ASPHAULT DEPOSITS.

1902 of the Green River, the American Standard, and the Breckinridge Asphalt companies, amounted to 22,498 short tons (valued at $68,704). The Federal Asphalt Company shipped a few car-loads of product, presumably for experimental purposes. The first streets constructed of Kentucky asphalt rock were laid in the city of Buffalo, in 1890, when 12 miles were paved by the Breckinridge Asphalt Company.

The natural asphalt rock quite often contains bitumen in percentages of asphaltene and petrolene suited for street-making purposes, but in most cases bitumen must be added. In exceptional cases the asphalt rock as it comes from the quarries is too rich in bitumen to admit of proper mixing, and the American Standard Asphalt Company is considering the extraction of bituminous matter by solvent process. For street composition the crushed natural rock is mixed with pulverized limestone or marl and an asphaltic cement. The asphaltic cement consists, as the conditions may require, of Trinidad gum asphalt or petroleum residuum, in amounts determined by the character of the asphalt rock used. The crushing of the natural rock is usually done at or near the quarries, while the mixing of ground material with rock and asphaltic cement is done near the street under construction.

The property of the American Standard Asphalt Company lies about four miles northeast of Russellville, in Logan County, and is quite extensively developed, the quarry face showing about 17 ft. of asphalt ledge. The plant consists of a 250-ton gyratory crusher, with plain 14 by 18-in. rolls. Quarries, mill and tipple are connected by 1.5 miles of narrow gauge track, with 45 tram cars in operation. At Louisville, Ky., the same company is equipped with a plant for mixing and preparing asphalt material for street work. One short ton of crushed asphalt rock lays about 11 sq. yd. of 2-in. pavement. The plant of this company has a capacity of preparing material to cover 2,000 sq. yd. of street area per day.

The property of the Green River Asphalt Companies lies near Green River, at Young's Ferry, in Warren County. The overburden is moderately light, and the deposit is quarried. The location of the ledge is high above the water level, affording the advantage of gravity in handling the spalls from quarry to crusher and from crusher to barge. Recently the company has established a crushing plant at Bowling Green, to which point the spalls are shipped by water. In this plant corrugated rolls are used and hot air is injected into the stream of ore as it comes from the crusher to expel moisture. This plant has a capacity of 200 tons per day.

The property of the Breckinridge Asphalt Company. is situated in Breckinridge County, near the town of Garfield. At the plant of this company the broken asphalt rock passes through beaters revolving about a horizontal shaft. The first beater revolves at a velocity of 600 revolutions per minute, delivering the rock to a 2-in. screen. A second beater revolving at a velocity of 1,200 revolutions per minute takes the material and delivers it to a 0.25-in. screen. Material over 0.0625 in. is returned to beaters. The capacity of the plant approximates 100 tons per day.

The property of the Federal Asphalt Company, near Big Clifty, in Grayson County, has been slowly developed, owing to a fire which destroyed the mill on the first day of operation. The erection of another plant of large capacity is contemplated.

A NOTE ON SILOXICON.

By EDWARD G. ACHESON.

The descriptions of the new refractory substance, siloxicon, that have recently appeared in the newspapers, have created such a widespread interest, as evidenced by the numerous inquiries received from all parts of the country and all lines of industry, that it is desirable to correct a statement that was contained in these publications.

It was there stated that siloxicon was inoxidizable, but recent investigations have shown that this is not true. When it is heated to or above 2674° F. in an atmosphere containing a large amount of free oxygen decomposition occurs.

Siloxicon, while variable in composition, may be represented by the formula Si_2C_2O, and when heated, as above stated, in presence of free oxygen, decomposition takes place, probably in accordance with the following equation:

$$Si_2C_2O + 7O = 2SiO_2 + 2CO_2.$$

If the siloxicon be in the form of a brick or other molded mass the reaction occurs on the surface, producing a vitreous glaze, which in most instances is tinged light green from the presence of iron.

In the absence of free oxygen or in a reducing atmosphere no such decomposition occurs, and the temperature may be raised to the point of the formation of carborundum, or, approximately 5000° F., before any change occurs, and then it takes place, it is thought, in accordance with this equation:

$$Si_2C_2O = SiC + Si + CO.$$

solid carborundum remaining, while the vapor of silicon and carbon monoxide are given off.

It is interesting to note that after having discovered this oxidation of siloxicon, tests were made with carborundum and it was found to be affected in a manner exactly similar to siloxicon; this notwithstanding the fact that for more than twelve years it had been generally considered inoxidizable.

EXPLORATIONS IN LABRADOR.—An expedition to Labrador will start from Boston in the early part of July of this year, under the leadership of Mr. Willard Glazier, of Albany, N. Y. From Hamilton Inlet, on the east coast of the peninsula, the party will ascend the Northwest River, cross the divide to the head of George River, and follow the latter to Ungava Bay. It is expected that valuable information will be secured as to the geography and geology of the little known portions of Labrador.

COAL IN THE ASTURIAS, SPAIN.—A recent British consular report says that the most important industry in the Asturias, coal mining, was not favored during the year 1902 with much prosperity, although the output of coal was increased by 127,000 tons over the preceding year. In 1902 there were produced 1,716,940 tons, as against 1,589,760 tons in 1901, and 1,472,000 tons in 1900. The coal owners found themselves with a large stock on hand at the close of the year, on account of the small demand for Asturian coal from their principal markets, Barcelona and Bilbao, during the preceding months. This is to be explained by the cheap foreign freights ruling, in consequence of which contracts were entered into for the supply of increased quantities from the United Kingdom by the largest consumers at these ports, to the detriment of the shipment of Asturian coal from Gijon and Aviles.

COMPARATIVE MINING COSTS.

The following comparison between mining costs at representative mines in the Transvaal and Western Australia, respectively, will be of interest.

The unit used is the English shilling. The month for which costs are quoted is March, 1903. The item of development is omitted; so are London office expenses and directors' fees, which are too variable and too arbitrary to be included in a comparison of the costs at the mine:

	South Africa.		W. Australia.		
	Ginsberg.	Wemmer.	Primrose.	Great Fingall.	Sons of Gwalia.
Tons	6,430	7,840	15,615	8,671	8,855
Costs:	s.	s.	s.	s.	s.
Mining	18.486	14.732	12.98	11.9	12.9
Transport	0.623	....	....	....	....
Milling	3.712	3.911	1.94	9.2	5.4
Concentrating	1.173	....	....	....	....
Cyaniding sands	2.480	2.402	3.72	....	....
Cyaniding slimes	None.	0.542	None.	None.	None.
General expenses	2.754	1.491	1.48	3.5	3.0
Maintenance	0.785	....	....	....	....
Total	30.043	23.078	20.12	24.6	21.3

In these regions the method of ore treatment is nearly identical, that is, stamp-milling, followed by concentration and then by cyanidation.

In the Transvaal they use the American, or short, ton of 2,000 lb.; in Australia, the long ton, of 2,240 lb. In the above table the tonnage is given, in every case, in short tons.

Of course, the cost of labor varies in the two regions compared above; the same can be said of the item of power, both being higher in West Australia than in South Africa.

COAL PRODUCTION OF MISSOURI.

According to advance statements received through the courtesy of the Bureau of Mines, the coal production of the State of Missouri for the calendar year was, in short tons:

	1901.	1902.		Changes.
Coal mined	3,813,527	4,067,166	I.	253,639
Value at mines	$4,716,331	$5,324,788	I.	$608,457
Av. per ton	$1.24	$1.31	I.	$0.07

Coke was not made in the State, in any quantity worthy of mention. There were 10 fatal accidents reported during the year, and 18 non-fatal accidents; a total of 25 persons injured.

COAL PRODUCTION OF WEST VIRGINIA.

Advance sheets from the report of Chief Mine Inspector J. W. Paul give the total production of coal in West Virginia for the fiscal year ending June 30, 1902, as follows, in long tons of 2,240 lb.:

	Tons.	Per Cent.
Shipped from the mines	19,497,311	83.5
Used in coke-ovens	3,368,624	14.4
Sold to local trade and tenants	288,220	1.2
Used in operating mines	204,928	0.9
Total coal mined	23,359,083	100.0

The production by districts was as follows: Potomac District, 1,622,076 tons; Monongahela, 6,431,734; Wheeling, 444,573; Kanawha-New River, 8,266,855; Norfolk & Western (Pocahontas, etc.), 6,473,835; small mines, 180,000 tons. Of the coal shipped, 836,403 tons went by the Kanawha and Ohio rivers; the balance by rail, chiefly over the Baltimore & Ohio, the Chesapeake & Ohio, and the Norfolk & Western railroads.

The average price of coal at the mines was 92.875c. per ton; this compares with 90c. in 1901. The average selling price of coke at ovens was $1.84 per ton.

The total coke made was 2,249,744 short tons, of 2,000 lb. The average yield was 1 ton of coke from 1.68 tons coal.

There were in use during the year 534 mining machines. The total coal mined with machines was 5,135,823 tons, or 21.1 per cent of the total.

The total number of mines, or openings from which coal was taken, was 408, an increase of 43 over the previous year.

The number of men employed at the mines was: Pick miners, 15,969; machine miners and runners, 4,813; inside laborers, 6,938; outside mine employees, 4,023; total at coal mines, 31,743. The number employed at the coke ovens was 3,404; making a total at mines and ovens of 35,147 persons. The average number of days worked at all mines was 249, which is 24 more than in the previous year. The average earnings of pick miners were $533.56, being $74 more than in 1901. The average rate for pick mining was 47.33c. per ton, run-of-mine, against 44.5c. in 1901. The coal mined per employee was 736 tons.

The number of accidents reported for the year, with the averages, per 1,000 employees and per 1,000 days' work, are shown in the following table:

Accidents:	Number.	Per 1,000 employees.	Per 1,000 days' work.
Fatal	120	3.78	0.015
Non-fatal	239	7.53	0.030
Total	359	11.36	0.045

In these averages the employees at coke-ovens are not included. The number of days' work is, of course, approximate only.

The causes of accident given in the report are as follows:

	Killed.	Injured.	Total.
Falls of roof	79	111	190
Mine cars	23	54	77
Dust and powder explosions	7	28	35
Gas explosions	..	5	5
Miscellaneous	11	41	52
Total	120	239	359

In view of this showing the mine inspector urges very strongly the necessity of greater care in supporting roofs. A large proportion of the accidents resulting from falls of roof were due to the carelessness of the miners themselves.

RETORT-OVEN COKE FOR FOUNDRY USE.*

By W. J. KEEP

In this paper, after describing the different methods of coke making in beehive ovens and retort ovens, the author goes on to say:

It is evident from a comparison of the methods that coke made from the same coal will have a slightly higher percentage of fixed carbon and a slightly lower one of ash, if made in a retort oven.

The beehive oven is almost always located at the mines, from which it draws its supply of coal. Retort ovens are frequently located in places that provide a market for the coke, and for the gas and other by-products. To allow a continuous operation of a retort-oven plant the product must be sold as fast as made and to do this a uniform quality of foundry coke must be maintained. The quality of retort-oven coke depends upon the skill of the operator, upon the method of preparing the coal and, more than all, upon the quality of the coal used.

Our experience with retort-oven coke began during the fall of 1901. We were at first induced to try one car, and when it arrived it was so black and in such small pieces and looked so badly, that we refused to try it in a cupola, but the makers proposed to pay for all poor castings and under these conditions we used it in the same proportion as the beehive coke that we had been using previously. The iron was very hot and satisfactory. We ordered five cars more and ordered retort-oven coke from other ovens until we decided that the coke worked well in spite of its very bad appearance. From that time to this we have never had a pound of other coke. All through 1902 the coke was so uniform and satisfactory that we melted 9 lb. of iron with 1 lb. of coke.

There is a great advantage in having a local retort-oven coke plant, because it enables the founder to keep in close touch with the source of his supply. Owing to the necessity of having a laboratory at a retort-oven plant to keep track of by-products, the coke manufacturer keeps himself informed as to the chemical composition of his coal and coke, and can make a very uniform product. Such local coke plants will have a very large variety of customers and therefore can supply the founder with a very uniform quality of coke, because any inferior coke can be sold to domestic users or to manufacturers where it will do no harm.

Experience has proven that with a retort-oven satisfactory foundry coke can be made from coal that when coked in a beehive oven would be unfit for foundry use. This helps the founder in that it greatly widens the field from which he can draw his future supply of fuel. Retort ovens are at present being erected in various cities, and I understand that an 80-oven plant will be in operation in Milwaukee in a few months. This will be a great relief to the founders of that city.

* Abstract of paper read before the American Foundrymen's Association, June, 1903.

UTILIZING BLAST-FURNACE GASES.—Messrs. Schnieder & Co., of Le Creusot, France, have recently completed two 600-h.p. single-cylinder gas engines on the Delamare-Debouteville system. They are intended for the works of the same company at Cette, and are designed to utilize the waste gases of the blast-furnaces and act as blowing engines.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—Imports of fuel into Spain for the four months ending April 30 were 691,874 tons coal and 67,798 tons coke. Exports of minerals for the four months are reported by the *Revista Minera* as below, in metric tons:

	1902.	1903.	Changes.
Iron ore	2,392,117	2,517,374	I. 125,257
Copper ore	317,446	334,802	I. 17,356
Zinc ore	19,779	43,289	I. 23,570
Lead ore	1,207	892	D. 315
Iron pyrites	160,840	174,341	I. 13,501
Salt	84,716	89,118	I. 4,402

Exports of metals were 11,235 tons pig iron, against 22,103 tons in the corresponding period of 1901; 10,342 tons copper, against 8,030 tons; 905 tons spelter, against 899 tons; 47,605 tons lead, against 53,581 tons last year.

POWDERED ALUMINUM FOR PAINT.—The *Metal Industry* says that the value of paint made from aluminum powder has been thoroughly demonstrated, and such paint now forms one of the standard articles of commerce. The materials previously used for the purpose of making a white metallic paint were zinc, tin and silver. The zinc is open to the objections of tarnishing and not giving the dead white color so much admired in the aluminum paint. Tin, while not readily tarnishing, does not remain in a particularly bright condition, but soon forms a dead surface over the entire article which gives it an unsightly appearance. Silver, of course, is too costly for general use, and soon tarnishes. Aluminum, then, appears to be particularly suited for this use and its color and non-susceptibility to atmospheric influences place it in the front rank of metals for paint. In fact, it is only surpassed for this purpose by gold itself.

MELTING NICKEL IN THE CUPOLA.—At the recent meeting of the American Foundrymen's Association, Mr. A. K. Beckwith, of Dowagiac, Mich., gave the results of operations at the Beckwith Estate plant, in the recovery of nickel from scrap anodes used in the nickel-plating process. While the usual practice is to melt such scrap in crucibles, his company had fitted up a cupola for this purpose. Nickel being more infusible than iron required considerably more coke. On the bed the ratio of coke and metal was 1 to 1; in the charge, 2.5 of metal to 1 of coke. The custom was to melt 500 lb. at a heat. In the operation of which he presented the figures, there had been melted 825 lb. of scrap, and two heats were required. The bed had 200 lb. of coke and 200 lb. of nickel scrap; in the charge there was 40 lb. of coke to each 100 lb. of scrap. The 875 lb. of scrap was worth $218.75; 640 lb. of coke cost $2.25; molder's work, $3; a laborer, $2. Total cost, $226. The yield was 635 lb. of nickel anodes, at 50c., or $317.50. In addition there was 75 lb. of scrap at 25c., or $18.75. The total received was $336.25, making the profit in the operation $110.25.

ABSTRACTS OF OFFICIAL REPORTS.

Copper Range Consolidated Company, Michigan.

This company controls a considerable area of mining property in the copper district of Michigan, the extent of its holdings being shown below. The capital stock is $28,500,000. The company was organized December 2, 1901, and its first report covers the period from that date to December 31, 1902.

The report says: "The Copper Range Consolidated Company was formed to consolidate the Baltic Mining Company and the Copper Range Company of Michigan, and issued its shares in exchange for shares of those two companies on the basis of one share of Copper Range Consolidated Company for each share of Baltic, and 1.5 shares of Copper Range Consolidated for each share of Copper Range Company. At the same time, 35,000 shares of Copper Range Consolidated Company were offered to shareholders in the Baltic and Copper Range companies at $40 per share, payable in easy installments. The $1,400,000 which was received from the 35,000 shares so offered was needed to complete the equipment of the Baltic Mine and mill, so as to be able to produce and mill 2,000 tons of rock per day, $300,000; to build the extension of the Copper Range Railroad to Calumet and other new mileage, $700,000; to provide one-half the amount necessary to complete the equipment of the Champion Mine and mill, so as to be able to produce and mill 2,000 tons of rock per day, $400,000.

"The plan of consolidation met with practically the unanimous approval of the shareholders of both companies, so that at this date all but 27 shares of the 100,000 shares of the Baltic Mining Company are either owned by the Copper Range Consolidated Company or held by the directors of the company in our interest; and all but 76 shares of the 100,000 shares of the Copper Range Company of Michigan are so held.

"*Baltic Mining Company.*—This company commenced operations in December, 1897, on what was then an entirely new lode not worked at any other point. Under the careful management of Mr. John Stanton, by whom the company was organized, development work was carried on scientifically and economically, and in July, 1899, advantage was taken of an idle head at the Atlantic stamp mill to thoroughly test the quality of the rock before spending the large sum necessary for the erection of a modern stamp mill. Work on the Baltic Mill was commenced in 1900, and was completed in the latter part of 1902, since which time three heads have been stamping on Baltic rock and one head on Champion rock until March, 1903. Since stamping began in 1899 the production has steadily increased, and the yield of copper per ton of rock stamped has also increased, but the small amount of rock stamped has been so out of proportion to the large amount of underground work carried on that no fair operating test of Baltic, as a mining proposition has been obtained until very recently.

"The cost of treating a ton of rock, which includes all expenses at the mine and mill, averaged for the year 1902, $1.73, but in January of that year, stamping 9,672 tons, the cost was $3 per ton. This cost steadily decreased as the quantity of rock stamped was increased, until in August, stamping 29,177 tons, the cost fell to $1.49 per ton. The most favorable condition for the lowest operating cost of the mine will be when the ability of the mine to supply the mill shall just equal the ability of the mill to handle the output of the mine, and this condition we are on the eve of attaining.

"In the year 1902 the company stamped 275,932 tons of rock, producing 6,285,819 lb. of copper, which was sold at an average price of 11.87c. per pound, yielding a profit of $182,762. This amount of copper produced, as above, had never before been attained in Lake Superior within five years after the opening of a mine, with the possible exception of the Calumet & Hecla. In the month of March, 1903, we stamped 38,417 tons of rock, produced 928,279 lb. of copper—an average of 24.16 lb. per ton of rock stamped, which was sold at an average price of 14.57c., and made a profit of $63,000. The superintendent of the mill assures us that in a very short time the daily stamping capacity will reach 2,000 tons, when we should have a corresponding increase in our production.

"*Copper Range Company of Michigan.*—The property of this company is as follows: 50,000 shares of the Champion Copper Company capitalized for 100,000 shares; the remaining 50,000 shares being owned by the St. Mary's Mineral Land Company; 9,300 acres of land, lying west of and contiguous to the Champion Mine location, extending entirely across the copper-bearing formation and upon which no explorations have yet been made; the entire capital stock of the Copper Range Railroad Company having a par value of $2,605,100; a frontage of about four miles on Lake Superior adjacent to the Champion mill-site, and containing the most desirable unoccupied stamp-mill sites in Houghton County. For additional mileage now completed and including the Calumet Division, the Copper Range Company will receive $600,000 additional first-mortgage bonds of the railroad company, which will be an available asset.

Champion Copper Company.—This company's territory covers 1,210 acres and has a length on the lode of 8,960 ft. The lode was discovered by Dr. L. L. Hubbard in May, 1899, and preliminary explorations carried on by the Copper Range Company. In October, 1899, the Champion Copper Company was organized by the St. Mary's Mineral Land Company and the Copper Range Company, each contributing about 600 acres of land and each taking one-half of the 100,000 shares of the Champion Copper Company stock. The 1,210 acres making up the mine location were so selected that nearly the entire acreage carries the underlay of the lode, and at the extreme boundary of the property the Champion lode could be mined to a depth of 18,950 ft. without going beyond its territory. The Champion lode and the Baltic lode are believed to be identical. The Champion Companion commenced operations in 1899 after the value of the Baltic lode had been fully demonstrated. The original openings extending for a distance of nearly a mile on the property were so uniformly rich and strong that from the beginning everything was planned for very large nad extensive operations. Four large three-compartment shafts have now attained an aggregate depth of 3,600 ft. There are 22,000 ft. of drifts, besides 44 raises more or less completed in preparation for stoping. The lode, of extraordinary width, has shown remarkable uniformity in its copper-bearing qualities, and carries a larger percentage of copper than any mine in the Lake Superior District, except the Calumet & Hecla. It is estimated by our general manager, Dr. Hubbard, that the ground already proven—4,000 ft. in length and an average depth of 900 ft.—is sufficient to supply 2,000 tons of rock per day of the quality we are now producing, for a period of more than 20 years, and the length of the lode on the company's property is twice the length already developed. It is the firm belief of your management that the values will hold to the limit of depth to which it is practicable to carry on mining operations.

"In January, 1902, the company began stamping with one small head at the Atlantic Mill, and during the year stamped 120,485 tons of rock, all of which came from the opening work preparatory to regular operations when the Champion Mill should be completed. The product was 4,165,784 lb. of fine copper, an average of over 34 lb. to the ton of rock stamped. The Champion Mill has now in commission three heads of stamps, and the fourth head will be ready by May 1, so that when full efficiency is attained we shall be in a position to stamp 2,000 tons of rock per day. We are already making plans for an addition to the mill and the installation of two additional heads, which the mine will be abundantly able to supply before the installation can be completed.

"The company had expended for construction and development up to December 31, 1901, $865,325, and in 1902, for new equipment of the mine and mill, $697,870, all development work in that year (1902) comprising 1,000 ft. of sinking and 11,000 ft. of drifting, and all mining and other expenses in that year were charged to and paid for out of the proceeds of the small amount of copper produced.

"*Copper Range Railroad Company.*—This company completed its main line from Mass City to Houghton, Mich., 41 miles, on December 27, 1899, connecting with the Chicago, Milwaukee & St. Paul at Mass City, with the Mineral Range Railroad and the Duluth, South Shore & Atlantic at Houghton. The development of the territory controlled by the railroad has been so remarkable since the main line through the South Range was built that we have been constantly building additional mileage to reach the mines and mills contributary to the line, and adding additional equipment and motive power to handle the constantly increasing traffic. The business of all the mines served is secured by exclusive contracts extending over a long term of years at fixed rates. The mileage in operation December 31, 1902, included 41.11 miles main line, 22.02 miles branches and 21.86 miles spurs. The extension to Calumet and Laurium, 20 miles, has been completed since the close of the year. In 1902 the road earned $303,052; the expenses were $166,397, leaving net earnings $136,655. Interest and all charges were $69,125, leaving a surplus of $67,530. A large increase is expected in the current year.

"*Summary.*—The advance of $305,000 to the Baltic Mining Company included the taking up of outstanding loans of $140,000, which that company had at the time of the consolidation, and the balance represents expenditures for new equipment in excess of the income for 1902. The Baltic Company has paid from earnings in 1903, $135,000 of its indebtedness, in addition to $24,879 on account of new construction. We estimate that $35,000 additional will cover all other requirements for new construction for the current year, the principal item of which is the new hoist for No. 4 shaft.

"The estimates for new construction for the Champion Company to complete the equipment of the mine and mill to a capacity of 2,000 tons per day, including the new compressor and boiler house complete, machine shops and all machinery, amount to $200,000, of which we have already received from earnings of the first three months of 1903, $150,000.

"For the final estimates on the construction of the Calumet extension of the Copper Range Railroad, and for new equipment; also doubling the size of our coal dock and pockets, and erecting a third unloading tower, there will be required during the year about $250,000.

"Notwithstanding these considerable items of construction the outlook for the year is such that your directors believe all these requirements can be met, adequate working surplus accumulated, and the company be in a position to distribte its earnings among the stockholders before the end of the year."

A SCOTCH IRON COMBINATION.—The London *Colliery Guardian* reports that the amalgamation of the businesses of the principal malleable iron manufactures in Scotland, has now been carried through. The combine includes ten firms, and will be known as the Scottish Malleable Iron Company, Limited. The capital will be £1,000,000 sterling.

RAILROADS IN WEST AFRICA.—The construction of the Otavi Railway in German Southwest Africa is now assured, according to the *National Zeitung* (Berlin). The railway will not run through Portuguese territory. The Southwest Africa Company, which proposed to build the line in the first place, has, the journal says, transferred all its rights without any consideration to the Otavi Company, a purely German concern, which is under the supervision of the Imperial Chancellor. The cost of the line is estimated at $5,000,000. It will open a district believed to contain valuable mineral deposits.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Queensland. Annual Report on Mines. 1903. A. R. Macdonald, Under-Secretary for Mines. Brisbane, Queensland. Public Printer. Pages, 176; illustrated.

Records of the Geological Survey of Victoria. Volume I, Part 2. Edited by J. W. Gregory, Director. Melbourne, Victoria; Government Printer. Pages, 60; illustrated.

Transactions of the Kansas Academy of Science. Volume XVIII, 1903. Edited by G. P. Grimsby, Secretary. Topeka, Kan.; State Printer. Pages, 288; illustrated.

Transactions of the Association of Civil Engineers of Cornell University. Volume XI, 1902-1903. Ithaca, N. Y.; published by the Association. Pages, 100; illustrated.

Les Industries Chimiques et Pharmaceutiques. Volumes I and II. By Albin Haller. Paris, France; Gauthier Villars. Volume I, 496 pages; Volume II, 444 pages; illustrated. Price (in New York), $7.

The Statistical Year-Book of Canada. Eighteenth Year. 1902. Prepared by the Department of Agriculture; George Johnson, Statistician. Ottawa, Canada; Government Printing Bureau. Pages, 732.

Mining Rights in the Western States and Territories. Eleventh Edition, Revised and Enlarged. By R. S. Morrison and Emilio D. de Soto. Denver, Colo.; the Smith-Brooks Printing Company. Pages, 532. Price, $3.

Filter-Press Treatment of Gold Ores and Gold-ore Slimes, and the Leaching of Copper Ores; in Plant and Practice. Denver, Colo.; prepared and issued by the American Filter-press Extraction Company. Pages, 28; illustrated.

British Columbia. Annual Report of the Minister of Mines for the Year 1902. E. G. Prior, Minister of Mines; William F. Robertson, Provincial Mineralogist. Victoria, B. C.; Public Printer. Pages, 320; with maps and illustrations.

Telephony. Volume I. Location of Central Offices. Volume II. Construction of Underground Conduits. Volume III. Cable Plant. By Arthur Vaughan Abbott. New York; the McGraw Publishing Company. Volume I, 170 pages; Volume II, 190 pages; Volume III, 152 pages; illustrated. Price, $1.50 each.

BOOKS REVIEWED.

The Manual of Statistics. Stock Exchange Book. Twenty-fifth Annual Issue, 1903. New York; the Manual of Statistics Company. Pages, 1044, with maps. Price, $5.

This manual includes information with regard to the stocks dealt on in the different exchanges of the country. It includes securities of railroads, industrial companies, mining companies, street railroads and also State and Government obligations. The data given include the amount of stocks, etc., issued, brief summaries showing the nature of the property, lists of the officers and such other particulars as can be condensed in the small space necessarily allowed to each. Notes of the earnings and operations of the more important companies are also included, and there are several maps showing the location of railroad properties. In addition to this, tables are given showing the fluctuations of stocks and bonds for several years past, on the different stock exchanges of the country, and also some tables showing the general statistics of the production of grain, cotton, of the principal metals, and fluctuations in the prices of staple articles for several years. While somewhat less elaborate than "Poor's Manual," so far as railroads are concerned, it includes a wider range of companies. The manual has been carefully prepared, the experience of its publishers having shown just what is required. Several years of use have shown that it is in the main correct and generally reliable.

Anuario de la Mineria, Metalurgia y Electricidad de Espano. 1902. Compiled under the direction of Don Adriano Contreras. Madrid, Spain; the *Revista Minera.* Pages, 576.

This is the latest edition corrected up to the beginning of the current year of the useful manual which was started by the late Don Ramon Oriol, 12 years ago, and which has been continued by his successor, Don Adriano Contreras. It is a directory giving a list of the mining companies of Spain, the metallurgical and electrical works, the chemical works and the mining and metallurgical engineers. Combined with this, there is much useful information with regard to tariffs, railroad rates and other particulars effecting the mining industry. It is sufficient to say that, as in former years, the manual is carefully compiled, and gives a great deal of information useful or, in fact, indispensable to those who have business with Spain.

State of Montana. Eighth Report of the Bureau of Agriculture, Labor and Industry. 1902. J. A. Ferguson, Commissioner; L. B. Benedict, Chief Clerk. Helena, Mont.; State Printer. Pages, 728; illustrated.

This volume is the most elaborate and carefully prepared yet issued by the State of Montana. It calls attention to the magnitude and diversity of the natural resources of the State, and to the growth of its industries. A large part of it is, of course, devoted to the agricultural and cattle raising industries, but a considerable section refers to the mining, which makes up so important a part of the industries of the State. Labor organizations are also very fully treated. Statistics of production, population, etc., are included, and it gives much information about different sections of the State, their characteristics and natural resources. The volume is illustrated by many photographs, and contains also a directory of State, county and municipal officers. It will doubtless be appreciated by the people of the State, and those who are interested in its growth.

Reports of Mining Cases Decided by the Courts of British Columbia, and the Courts of Appeal therefrom, to October 1, 1902. *With Mining Statutes* 1853-1902; *and a Glossary of Mining Terms.* By Archer Martin, one of the Justices of the Supreme Court. Toronto, Ont.; the Carswell Company. Pages, 916.

The growth of the mining industries in British Columbia was for many years very slow. While coal was first discovered in 1835, the first proclamation and regulations relating to mining in the Province were not issued until 1853. The first case appearing in the law reports of the Province was not decided until 30 years later, in 1883. The early decisions of the courts related almost exclusively to placer mining, which was the first description of mining, which brought British Columbia into prominent notice. Since then, the mining laws and regulations have been more or less changed by legislation and by the decisions of the courts, and a body of mining law has grown up, which is of the utmost importance to those engaged in that important industry. The author of this work, who is one of the Justices of the Supreme Court of British Columbia, has now compiled an elaborate digest, giving the decisions of the courts in all important mining cases over the period of 50 years, from 1853 to date; and including also the various laws and regulations established by the Government, first of the colony, and afterwards of the Province. Judge Martin has had every opportunity to consider and arrange this compilation, owing to the nature of his position, and his thorough familiarity with the cases cited. Six years ago, he compiled an annotated synopsis of the mining laws, which was the first attempt to put the laws and decisions in a corrected and classified form. The synopsis, however, was necessarily very brief and much condensed, and other publications which have appeared since, were liable to the criticism that they were comparatively limited in extent. The present volume, therefore, possess an exceptional value, as it is the first collection of British Columbia mining laws and decisions which at all approaches completeness. It will also be of great service in putting in one convenient volume the various decisions and reports of cases, which are now widely scattered in volumes of legal reports, and in the records of the different courts.

The abstracts of decisions are arranged in chronological order, the first one cited having been decided in 1867, and the last in 1902. Where a case has gone to appeal, the date taken is that of the decision of the final court. They include cases relating to placer mining, to lode mining of metals, and to coal mining; to claims, locations and rights; and are believed to include all the cases on these subjects of permanent interest which have been decided by the courts. The head-notes and summaries have been carefully re-written, and are generally in brief and compact form, so that the points decided can be readily understood. As the author says, it is a difficult matter to define exactly what is properly a mining case, but it is clear, on the one hand, that the term is not confined to cases decided on the mineral acts alone; while, on the other, it is equally clear that cases which are determined on the ordinary principles of law applicable to tort and contract should not be included, even though mining companies, or mine owners, and employees should be involved. The cases include almost exclusively those decided under the mining laws of British Columbia, although there are some references to cases in other provinces of Canada. Owing, however, to the difference in provincial laws, it has been thought advisable to refer to them only incidentally. There is given, however, a list of mining cases decided by the Supreme Court of Canada, and these have been included as an appeal lies to that tribunal from the provincial courts.

In addition to the record of mining cases, the volume includes the laws and regulations of the Province, beginning with the original proclamation of the governor, issued in 1853, and including the laws passed by the legislature, and the regulations made under them up to the date of publication. The appendix gives a glossary of mining terms, which was revised by Mr. William Fleet Robertson, the Provincial Mineralogist. A very full analytical index adds to the value of the volume.

As we have already said, nothing in relation to the mining law of British Columbia exists, which at all approaches the completeness of this publication. It will certainly become a standard work of reference with which lawyers cannot dispense. The book has a handsome setting, the typographical work and binding fitly emphasizing the value and importance of its contents.

ACETYLENE LIGHTING IN SMALL TOWNS.—The increasing production of calcium carbide has cheapened its cost to the consumer and initiated the installation of acetylene gas plants in small towns, particularly in Germany. It is contended that with calcium carbide worth 28 marks ($6.66) per 100 kgs., delivered, acetylene can be sold at 1.80 marks (43c.) per cubic meter. A plant for towns with 4,000 to 5,000 inhabitants should not cost more than 70,000 marks ($16,660), which includes 8 kilometers of main, 80 or 100 public lamps complete with burners and mantles, 150 meters, supplies to 1,500 private burners, a holder storing 110 cu. m. of gas, and heating apparatus for the plant; but does not include the cost of ground upon which the works are to be erected. A coal-gas plant of similar size, it is said, would cost at least 160,000 marks ($38,080), and an electric supply station 200,000 marks ($47,600). As regards the explosions that have occurred, it is stated they have been due chiefly to carelessness with a naked light.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON PLACER MINING MACHINERY IN CANADA.—A recent notice from the Canadian Customs Department, dated May 17, makes the following announcement:

"That machinery and appliances, of a kind not made in Canada, for exclusive use in alluvial gold mining be added to the free list until June 30, 1904."

WHAT MUST BE SHOWN TO ENTITLE COMPANY TO RIGHT OF EMINENT DOMAIN.—As the power of eminent domain can only be exercised for public use, the instrument of appropriation of a natural gas company in a proceeding to condemn for a pipe line, under the laws of Indiana (Burn's Revised Statutes, 1901, section 5103) must show that it is engaged in furnishing gas to the public; it is not enough to allege that the real estate is necessary for its pipe line from its wells to a city. Such appropriation is an easement only; it cannot take the fee.—Great Western Natural Gas & Oil Company v. Hawkins (66 *Northeastern Reporter,* 765); Appellate Court of Indiana.

MINER NOT BOUND TO MAKE CRITICAL EXAMINATION OF APPLIANCES.—Though a miner assumes all risks of which he knew, or by ordinary diligence could have learned, and an operator of a mine is not liable where the hazard is equally open to the observation of both, the employee is not bound to make a critical examination of the appliances furnished for his use, but is entitled to rely upon the employer's performance of his duty to furnish reasonably safe appliances. And in an action for injuries caused by the defective condition of a ring used to maintain the equilibrium of a hoisting bucket, evidence that the bucket in being hoisted would frequently strike the sides of the shaft is admissible.—Brazil Block Coal Company v. Gibson (66 *Northeastern Reporter,* 882); Supreme Court of Indiana.

WHEN LEASE WILL NOT CONTINUE THOUGH RENTAL HAS BEEN PAID.—A landowner leased his premises to a gas company for ten years, and as much longer as gas was found in paying quantities, or the rental paid as provided. If the gas was found in quantities sufficient for manufacturing purposes the lessee was to receive $100 per annum for each well from the time gas was used from same for such purpose. Until the lessee drove a well, and began to use gas from same for such purpose, it was to pay $50 per year "rent." It was held that the lease was not continued in force beyond the ten years by the lessee completing a paying well, but closing it up and continuing to pay only $50 rent.—American Window Glass Company v. Williams (66 *Northwestern Reporter,* 912); Appellate Court of Indiana.

WHEN A MINER CANNOT RECOVER FOR INJURY FROM FALLING ROCK IN MINE.—T. and another employee were driving a heading in a coal mine and were charged with the duty of pulling down or timbering up loose rocks. After driving a heading several feet and timbering up one rock they drove it a few feet past the timbering, thus uncovering another rock. T. was then ordered to cut off a corner several feet short of the last rock, and his fellow worker continued to drive the heading, thus further uncovering the rock, and while T. was passing under it to get a sledge for his fellow worker it fell and injured him. It was held that it was as much his duty to see that the rock was safe as that of his fellow worker, and in failing to perform such duty he was guilty of such negligence as would prevent his recovery of damages.—Pioneer Mining & Manufacturing Company v. Thomas (32 *Southeastern Reporter,* 15); Supreme Court of Alabama.

DUTY ON IMPORTED COAL RETAINED ON VESSELS.—An importation is complete when the goods are brought within the limits of a port of entry with the intention of unlading them, and the right of the Government to duties then attaches. It is not essential to that right that the goods should be actually unloaded.

Coal was imported on a steamship and entered at the custom house, but a portion of it was purchased by the owners of the ship and retained in the vessel's bunkers as part of her coal stores for the return voyage, and was never unladen. Held, that it was nevertheless dutiable; that the sale being made after the importation was complete could not operate to defeat the Government's right to duties. Held, also, that it was not free under paragraph 523, tariff act of 1897, as "coal stores," nor under section 2798 of the Revised Statutes, relieving masters of steam vessels from the obligation of unloading their coal and paying duty upon it.—Appeal of A. C. McDormand from Collector of Customs at Boston; Board of General Appraisers.

THE LAW OF INDIANA REGARDING CONFINING THE FLOW OF GAS.—In a prosecution for violating the law of Indiana (Burns' Revised Statutes, 1901, section 7510-12) prohibiting the owner of natural oil or gas wells, or any person in charge of the same, to permit gas or oil to escape into the open air for a longer period than two days next after such gas or oil shall have been struck in such well, the evidence showed that the well from which gas was permitted to escape was being bored for oil, and that after the gas was struck the operation of sinking the well was continued until the flow of oil was obtained, and there was no evidence that the gas-bearing rock or sand could not have been penetrated some considerable distance, and the work of confining the gas completed within two days from the time when it was first struck. It was shown, moreover, that at any time after the gas began to flow into the well and escape from it, it might have been confined in the well by flooding the same with water, and the operation of sinking continued without any inconvenience. It was held that such evidence failed to show the necessity for further time for confining the gas, or that any injury or oppression would result from a literal construction of the statute.—Given v. State (66 *Northeastern Reporter,* 750); Supreme Court of Indiana.

IRON MINING IN GREECE.—A company has been formed in Brussels, with a capital of $600,000, to be known as La Societe des Mines de Fer de Larymna, to acquire and work the iron ore mines at Larymna in Greece.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Covering Power of White Lead.

Sir.—Your correspondent, Mr. A. Heckscher, rightly draws attention to an error in a "Metallic" on the above subject. It was a blunder of transcription which made one say that zinc-white was used as a cheap adulterant of white lead. Such a statement was, of course, absurd. The usual adulterants are barytes, whiting and gypsum.

THE CONTRIBUTOR.

London, June 10, 1903.

The Colombian Emerald Mines.

Sir.—The conditions under which the Colombian Government offers to lease its emerald mines, as quoted in your last issue from a consular report, are an excellent illustration of "how not to do it." It seems that, in addition to demanding a large rental the Government reserves the right to take possession of the mines at any time, without judicial process, and even using force, if necessary. The uncertainties of mining—especially emerald mining—are surely enough to discourage investors, without the additional risk of being dispossessed at the whim of whoever may happen to control the Government for the time being. No investor in possession of his senses would put any money into plant for working the mines—to say nothing of paying rental—on such terms. Is it possible that the Colombian Government expects this offer to be taken seriously? I do not know what the yield of the emerald mines, or their possible value, may be; it seems quite certain that no foreign company will lease them.

INVESTOR.

New York, June 22, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Nitrate of Soda.—Are there any nitrate of soda beds in the United States or Mexico other than those in the Death Valley of California?—W. E.

Answer.—No. It is surprising that the Death Valley is virtually the only place where niter has been discovered in quantity, although extensive deposits of natural soda exist in the arid regions of Nevada, Wyoming and other Western States, and in Sonora, Mexico.

Biotite.—Who can supply this mineral for commercial uses?—E. R. C.

Answer.—Biotite is a variety of mica, also known as "black mica," highly colored with oxide of iron, is not abundant, and is of less importance commercially than other varieties of mica. Moderate supplies can be obtained from Eugene Munsell & Co., 218 Water Street, New York City, or Hall & Carpenter, 709 Market Street, Philadelphia, Pa.

Manganese Peroxide.—I have some 20 or 25 tons of manganese peroxide ready for market, and much more in sight. Where can I dispose of this mineral?—H. L. M.

Answer.—Manganese peroxide is of increasing importance, especially in the manufacture of ferromanganese and spiegeleisen, for which purposes the ore is purchased on a basis of 50 per cent manganese content, and less than 8 per cent silica and 0.1 per cet phosphorus. The United States Steel Corporation, at 71 Broadway, New York City, or at its purchasing offices in Pittsburg and Chicago, would likely consider your correspondence. Incidentally, it should be mentioned that some manganese ore is also employed in the brick industry as a coloring material; and other uses of less importance are also found for the mineral. The demand is satisfied largely by importations from Russia, the West Indies, Brazil and Spain, as consumers can make time contracts with foreign producers at very advantageous prices.

Titaniferous Iron Ores.—Will you kindly state, through your JOURNAL, the present status of smelting titaniferous iron ores. Current belief here is that such material is regularly smelted in Scandanavia, and that a process (electrical) is about to be introduced in New York State. As there are quantities of titanium-bearing magnetites in this region, I am inclined to suspect the familiar relationship between thought and wish.—C. H. C.

Answer.—If you will refer to the ENGINEERING AND MINING JOURNAL, January 31 last, page 192, you will find some statements regarding smelting of titaniferous ores. Such ores are smelted in Sweden, in charcoal furnaces, but only to a small extent. Norway ilmenite has been smelted at Norton-on-Tyne, England. Titaniferous iron ores were used in the old Adirondack Furnace, in New York; but that furnace has not been in operation for a number of years. At the present time we do not know of any furnace running on such ores. The electrical smelting process, about which items have appeared

in the newspapers recently, is in the experimental stage as yet. Moreover, it seems quite certain that the cost of electric smelting is too high to make it commercially possible, except under very unusual circumstances. It must be said that the free use of titaniferous iron ores may be made possible hereafter, by some new improvements, or processes; but at present it cannot be considered as being practicable.

Joplin Lead Ore Quotations.—Can you tell me what percentage of lead there is in the ton of lead ore as sold at Joplin. On May 9 your quotation was $54.50 per ton (in issue of May 16). In your market report you generally give zinc ore quotation for 60 per cent zinc, but have never mentioned what percentage of lead the lead ore carries.—G. D. W.

Answer.—The lead ores produced in the Joplin District are sold on straight bids, presupposing that they will smelt 70 per cent lead. This arrangement is comparatively recent. The old plan, still in use to some extent, was to base the price on the market quotation of pig lead at St. Louis. The quotation was multiplied by 7, and the smelting charge was deducted, the remainder being the price of "neutral" mineral—that is, without royalty deductions. Thus when pig lead was $4.15 per 100 lb. at St. Louis, the calculation would be: $4.15 \times 7 = 29.05 - 2.50$ (for smelting charge) $= \$26.55$. The price would then be $26.55 per 1,000 lb., or $53.10 per ton. In many of the old leases the owner reserved the right to buy ore at a fixed price, also based on the price of lead at St. Louis. This was a complicated system, and it would take too much space to explain it here. It resulted in giving the owner an exorbitant royalty, and has been generally given up. At present, as stated above, ore is sold on straight bids, basis of 20 per cent lead; leases being made on a percentage royalty, based on the total receipts.

Charcoal in Copper Blast-Furnaces.—Can you inform me to what extent it is practicable to use charcoal in a copper blast-furnace?—T.

Answer.—The use of charcoal in copper blast-furnace practice is perfectly feasible, but not as simple an operation as smelting with coke. The usual difficulty met with is, that the charcoal is burned dead in the pits or kilns. When an over-burned charcoal is put in a furnace constructed for using coke, it flashes up like so much shavings, and the charge freezes up. But charcoal has been used the world over in the smelting of copper ore since the age of bronze. All that one has to do is to see that the charcoal is properly burned, and modify the furnace for the use of that class of fuel. However, where coke is not available, why not use reverberatories and wood? We are inclined to favor reverberatories as against blast-furnaces for many ores, in any event, as more economical and doing better work. There is nothing new about wood-burning reverberatories. The modern copper blast-furnace is considered by some experts as an exceedingly crude apparatus—actually a reproach to our metallurgists. It is the result of men copying from one another, blindly following the initiative of a successful plant. Of course, the quality of the ore to be smelted influences the choice of a smelting process, whether it be oxide or sulphide, fine or coarse. In considering the smelting of a copper ore in a country where there was plenty of wood, the up-to-date metallurgist would hesitate about using a blast-furnace at all; but would probably adopt a reverberatory with gas-firing.

The Wohlwill Refining Process.—Can you give me some account of the Wohlwill electrolytic process for refining gold?—G. M. H.

Answer.—Briefly, we would state that the Wohlwill electrolytic process for the direct refining of impure gold was first patented in Germany, and in 1896 in England, and subsequently in the United States. In this country it is in commercial use at the United States Mint, in Philadelphia, which has the exclusive right to its employment here. The process may be described as follows:

A certain quantity of hydrochloric acid, or an equivalent amount of alkaline chloride, is used in the electrolyte to suppress the evolution of chlorine from the anode, and thus causes a solution of the gold. The electrolyte is a strong aqueous solution of gold chloride (25 to 30 grams gold to the liter) impregnated with free hydrochloric acid, or an alkaline chloride, as sodium chloride. These substances, however, combine with the gold chloride to form readily soluble double salts of gold, known as the "chlor-aurates," so that the electrolyte, properly speaking, is a solution of an aurate of gold. The quantity of these substances necessary to be added, depends on the temperature of the electrolyte, and the current density; for hydrochloric acid it is about the same by weight as the gold content; while for sodium chloride, it is somewhat less. The following two equations represent the dissolving of the gold during electrolysis:

(1) $Au + 3Cl + HCl = HAuCl_4$
(2) $Au + 3Cl + NaCl = NaAuCl_4$

While the equation $AuCl3 = Au + 3Cl$ represents the electrolytic deposition of gold, the hydrochloric acid and sodium chloride, not being decomposed by the current, may be viewed as carriers of gold chloride.

One of the difficulties experienced with the process is in refining bullion containing very considerable amounts of copper, silver, etc.; in such cases, more or less frequent renewal or purification of the bath becomes necessary. We would add also that the process is in use at Hamburg, Germany, and in France, and is apparently working successfully. Should any one purpose utilizing the process in this country, permission would have to be gotten from Dr. Tuttle, at the Philadelphia Mint, who secured the American patent rights from the owner. We would suggest that if you desire fuller details as regards the process, that you write to the United States Patent Office for the specifications Nos. 625,863-625,864, and of date May 30, 1899, issued to Emil Wohlwill, Hamburg, Germany.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending June 16, 1903.

730,886. DUMP-CAR.—John V. Domingue, Pointe a la Hache, La. In a dump-car, the combination with the frame, of the movable bottom and sides mounted on the frame, there being a hinged connection between the sides and bottom, means for projecting said hinged parts laterally to cause all of them to stand in the same inclined plane, and means for restoring said parts to their normal position.

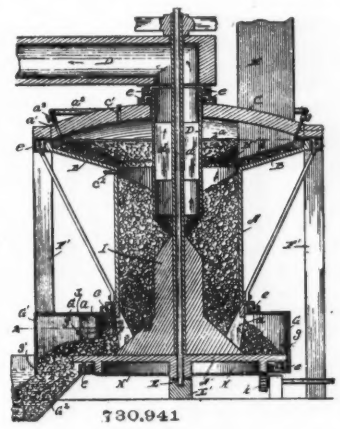
730,900. TUMBLING MILL OR BARREL.—James W. Fuller, Catasauqua, Pa. In a tumbling barrel or mill, an external cylindrical shell and an internal concentric lining, said lining formed of a series of segmental plates overlapping at the ends to form annular sections for the lining, one section having at one end a flange overlapping an unflanged end of an adjacent section, bolts passing through the flange and through the external shell and adapted to tightly clamp the overlapping sections together and to the shell, and a series of semispherical indentations extending a short distance into the inner face of each plate and arranged in rows, said rows being in staggered relationship to each other.

730,907. MINER'S LAMP.—Thomas Gossack, Belt, Mont. A hydrocarbonic-lamp comprising a wick-tube and a burner-head having a stem projecting at an angle thereto and rotatably engaged with the wick-tube, said burner-head having gas-openings in one side thereof positioned to lie either at the upper side or the lower side of the burner-head, corresponding to the position to which the head may be rotated.

730,922. DEVICE FOR CHARGING BLAST-FURNACES. Mark W. Johnson, Jr., Birmingham, Ala. The combination with a scale-car to carry the load from the source of supply and skips to elevate said load to the furnace, of intermediate vessels adapted to divide and receive the load from said car and independently deliver same to said skips.

730,940. APPARATUS FOR BAILING OIL-WELLS.—Henry S. Martin, Buffalo, N. Y. In combination with a plurality of bailers and well-cables, a drum for raising and lowering the bailers, means for connecting the cables to said drum, a friction-clutch and a friction-brake on said drum, a pilot adjacent to each bailer and mechanism connecting each pilot with said friction-clutch and friction-brake, whereby a plurality of wells may be bailed by a single source of power.

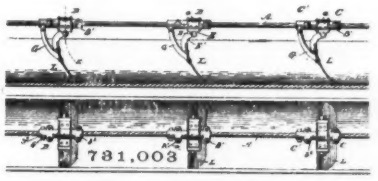
730,941. PROCESS OF MAKING PRODUCER-GAS.—Frederick W. Matthiessen, Lasalle, Ill. A process of making producer-gas which consists in separating, by distillation in the upper part of a chamber, the volatile parts of a fuel from the non-volatile parts by heat reflected upon the fuel



730,941

and oxidizing the volatile parts in the upper part of the chamber as a first step in the operation, and passing the non-volatile parts of the fuel to the lower part of the chamber and oxidizing them as a second step in the operation.

731,003. CONVEYER.—Freeman R. Willson, Jr., Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio. In



731,003

a reciprocating conveyer, the combination with the longitudinally-arranged reciprocating carrier or support, of the flight hinged thereto to swing bodily forward and back longitudinally thereof, and also hinged thereto, to swing transversely around the support.

731,035; 731,037; 731,038; 731,039; 731,041 and 731,045.—DIAMAGNETIC SEPARATOR.—Elmer Gates, Chevy Chase, Md., assignor to Theodore J. Mayer, Washington, D. C. A diamagnetic separator, comprising an electromagnet having pole-pieces separated by a long narrow interpolar space, and means for feeding the material into that part of said space which is in close proximity to the pole-faces, thereby leaving a central zone of lesser magnetic intensity into which move the particles of higher diamagnetic susceptibility.

731,036; 731,040; 731,042 and 731,044. DIAMAGNETIC SEPARATION.—Elmer Gates, Chevy Chase, Md., assignor to Theodore J. Mayer, Washington, D. C. The method of separating diamagnetic particles from a mixture containing them, which consists in feeding the mixture into a magnetic field having a central zone of lesser magnetic intensity than that into which the mixture is fed, continuing it in and subjecting it to the action of the field until the diamagnetic particles to be separated have gradually moved out from the mixture toward said central zone of lesser magnetic intensity, and then collecting said particles separately as heads.

731,043. SEPARATING DIAMAGNETIC METAL FROM SANDS, ETC.—Elmer Gates, Chevy Chase, Md., assignor to Theodore J. Mayer, Washington, D. C. In the art of separating free particles of diamagnetic metal (such as gold, copper, and the like), from other diamagnetic material (such as sand) with which they are associated, the preliminary method of first roughly segregating the diamagnetic metal from the mass, and then separating the remaining sand from the segregated material, which consists in admixing particles of magnetic material with the mass, enmeshing or entangling the diamagnetic particles thereby, concentrating the combined metallic particles and diamagnetic particles, and removing the remaining sand therefrom, by passing the concentrate through a magnetic field, and diverting the mixture of magnetic particles and diamagnetic metallic particles into a different path of collection from that of the particles of sand.

731,055. APPARATUS FOR MAKING METALLIC OXIDES.—Maurice Jacobi, Philadelphia, Pa., assignor of one-tenth to Oscar G. Boehm, Philadelphia, Pa. In an apparatus for making metallic oxides, the combination of a casing provided with draft-openings and having a bed of

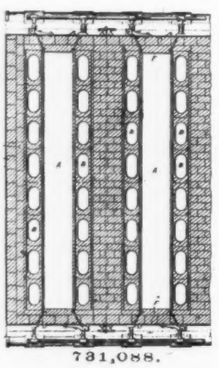
sand therein, a heating-pipe embedded in the sand, and rows of pots disposed therein and adapted to contain a supply of the metal and acid to be used in the process of oxidation.

731,059. RETORT FOR CARBONIZING WOOD OR THE LIKE.—Per L. Laurell, Stockholm, Sweden. A carbonizer comprising a retort having an open-ended central flue, a stack, an inclosing casing communicating therewith, a source of heat-supply, flues diverging therefrom below the retort and communicating with the central flue of the retort, whereby heated products of combustion will be first led beneath the retort, then up through the central flue over the top and down the sides to the stack.

731,070. PROCESS OF PREPARING CARBIDE OF CALCIUM.—Edgar F. Price, Niagara Falls, N. Y., assignor to Union Carbide Company, Niagara Falls, N. Y. A process which consists in mixing comminuted or granulated calcium carbide and comminuted or powdered bituminous coal, retorting the mass to drive off volatile matter and convert the bituminous coal into bituminous coke and produce the coherent mass or body, and then crushing the body or mass into pieces of commercial size.

731,082. PROCESS OF PREPARING METALS OR ALLOYS FOR LITHOGRAPHIC PRINTING.—Otto C. Strecker, Darmstadt, Germany. A process for preparing metal plates or alloys for lithographic designs, transfers and printing, consisting in submitting the prepared plates to the treatment of a solution containing two to four per cent. of a mixture of salts of complex acids whose constituent acids singly would form insoluable compounds with the metals employed, and an oxidizing means, which solution, acting on the metal and the latter on the chemicals applied in the process, forms on the plate as insoluble and hygroscopic layer which is firmly adherent to the surface of the metals of alloys employed.

731,088. RETORT COKE-OVEN.—Mahlon Updike, Chicago, Ill. A closed retort provided with means for conducting the gases and vapors therefrom and means for charging and discharging the same, and having side walls composed of



731,088.

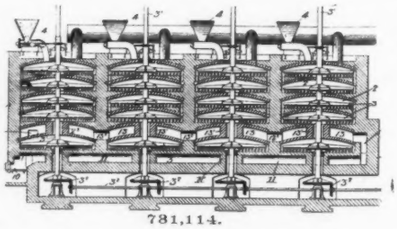
sectional flue-tiling, the openings through which form oppositely-arranged continuous serpentine flues for conducting the products of combustion in close proximity to the retort, a main flue connecting with the inner ends of said flues, and a combustion-chamber connecting with the outer ends of the same, in combination with a burner arranged in said combustion-chamber and constructed to drive the products of combustion into and through said flues.

731,095. CENTRIFUGAL PUMP.—Everett W. Brooks, Chicago, Ill. In a centrifugal pump, the combination with a suitable casing, of a hollow rotary piston having an axial inlet, one or more internal pallet members and peripheral outlets distributed or extending over an axial length of the piston substantially comprehending the divergent angles of delivery of the liquid induced by the impelling forces, the end wall portions of said pistons opposite the axial inlet being curved to substantially conform to the resultant lines of delivery at that end of the piston.

731,100. PROCESS OF UNITING METALS.—Alexander Dick, London, England, assignor to the American Brass Company, Waterbury, Conn. A process of uniting metals without melting, consisting in heating the metal and removing the end or edge portions of the parts to be united, while in a hot condition by a severing-tool, thereby producing nascent surfaces, the surfaces so produced being held against the face of the severing tool to avoid oxidation, then immediately pressing said nascent surfaces together and then working or forging the point to apply a suitably high welding pressure.

731,109. WELL-DERRICK.—Jacob C. Knupp, Chaffee, Pa. A derrick comprising a base portion formed of spaced side members having extended ends and connected by a centrally-disposed transverse member, and transverse members spaced from said central member, main vertical members connected to said central member and converging toward their free ends and connected by transverse tie-bars, inclined brace members secured to said base side members and to said spaced transverse members and likewise to said vertical members intermediately of their height, and stay-rods between the extended ends of said base members and the upper ends of said vertical members.

731,114. MUFFLE ROASTING FURNACE.—Franz Meyer, New York, N. Y. A muffle roasting-furnace, consisting of a plurality of vertical chambers, each made up of a series of



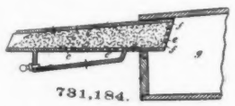
731,114.

superposed hearths discharging from one to the other and having rotary stirrers mounted upon a vertical shaft, and a heating-furnace common to the series.

731,152. PROCESS OF MAKING PIGMENTS.—William J. Armbruster, St. Louis, Mo. A process of making pigment which consists in making a zinc-salt solution, with the hydrate and carbonate of an alkali metal, and a soluble salt of barium, and recovering the resulting precipitates.

731,153. PIGMENT AND PROCESS OF MAKING SAME. William J. Armbruster, St. Louis, Mo. A process of making pigment which consists in mixing solutions of zinc sulphate, and a carbonate of an alkali metal, and a salt of barium thereby forming precipitates of barium sulphate, barium carbonate, and basic zinc carbonate.

731,184. PROCESS OF OBTAINING ZINC.—Evan H. Hopkins, London, England. A process of reducing and collecting zinc which consists in subjecting a material con-



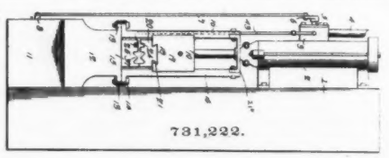
731,184.

taining zinc to heat in the presence of a reducing agent, excluding air and the heating-flame therefrom, and in conveying the zinc-vapors into and condensing all of them in a mass of heated carbon from which air is excluded.

731,198. METHOD OF TUNNELLING.—James C. Meem, Brooklyn, N. Y., assignor of two-thirds to the Borough Construction Company, Brooklyn, N. Y. A step in the method of constructing a tunnel, which consists in providing an under-blocked temporary arcuate roof-support, excavating beneath the same, and moving the support forward as rapidly as the excavation is completed beneath it.

731,242. ORE-CAR.—Arnold Stucki, Allegheny, Pa., assignor to Pressed Steel Car Company, Pittsburg, Pa. An ore-car, having an underframe without side sills, and comprising essentially center sills, bolsters and end platforms having converging sides, and a body mounted above said underframe, and provided with outwardly and downwardly opening doors arranged between the bolsters.

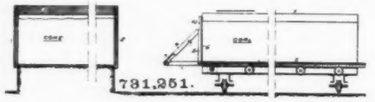
731,222. DRILL SHARPENING MACHINE.—Joseph Retallack, Victor, Colo., assignor of one-half to R. A. Trevarthen, Colorado Springs, Colo. A device comprising an



731,222.

upper and a lower die having cavities formed in their opposing faces for operating upon the tool to be shaped, said lower die having a tool supporting ledge extending forwardly beyond the upper die.

731,251. COMBINED CHARGING AND DISCHARGING DEVICE FOR COKE-OVENS.—Charles H. Wellman, Alfred Ernst and Fredellia H. Moyer, Cleveland, Ohio, assignors to the Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio. The combination of the movable



731,251.

hopper-bottom of a coke-oven-charging machine, with a pusher-plate and one or more brace-bars therefor, both the plate and its brace bar or bars being pivotally mounted upon the forward end of said hopper-bottom whereby they can be swung into horizontal position for withdrawal beneath the charge of coal in the oven.

731,252. APPARATUS FOR PUSHING COKE FROM COKE-OVENS.—Charles H. Wellman and Alfred Ernst, Cleveland, Ohio, assignors to the Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio. The combination, in a coke-oven pusher, of a double-ended pusher-bar, a structure upon which said bar is mounted so as to be projected from either side of the machine, and means for imparting longitudinal movement to the bar.

731,288. PUMP.—Antonio Dellanna, Salt Lake City, Utah. A pump, comprising a cylinder, means mounting the cylinder to move longitudinally, a relatively stationary piston held in the cylinder, and a transeversely-disposed guide slidably connected with the piston-rod to allow lateral movement of the piston.

731,297. STONE-DRESSING MACHINE.—Thomas Callagher, Falconer, N. Y. In a stone-dressing machine, the combination of a frame composed of two pairs of uprights having slotted tops and suitable connections, a glass-beveler's abrading-stone revolubly mounted in said frame, the uprights of one of said pairs placed on opposite sides of said stone, corss-bars adjustably mounted in the slotted tops of said pairs of uprights, guide-rails secured on said cross-bars, a carriage slidably mounted on said guide-rails, an arm and crank-wheel to give a reciprocating motion to said carriage, and an abrasive block adjustably mounted in said carriage.

731,300. CUPOLA.—Timothy Holland, New York, N. Y. The combination with a cupola, or an air-receiver arranged in the cupola, an air-baffling device in the receiver, a pipe leading into the receiver and terminating near the bottom thereof, and means for conducting air from the receiver to the lower interior of the cupola.

731,308. METHOD OF PRODUCING ELECTRODES FOR ELECTRIC ACCUMULATORS.—Ernest W. Jungner, Stockholm, Sweden. A method of electrolytically increasing the surface of carriers for active masses of accumulator-electrodes that are chemically indifferent to alkaline solutions, which consists in placing a cathode and a plate of a suitable metal, as anode, into a solution of an alkali-metal hydrate containing a suitable salt capable of forming a soluble combination with said metal plate, said combination being soluble in the solution with less rapidity than it is formed, and passing an electric current.

731,313. WELL-DRILLING MACHINE.—George D. Loomis, Tiffin, Ohio. In a well-drilling machine, a main rope-spool carrying a gear, a clutch-controlled driving-gear, and an intermediate gear shiftable into and out of mesh with the said gears.

731,315. REVOLVING SCREEN.—Volney W. Mason, Jr., New York, N. Y. In a revolving screen, an inclined revolving cylindrical screen and supports therefor at each end, combined with a thrust-roll adapted to receive the end thrust of said inclined screen, a stud on which said roll turns and means for adjusting said stud in a direction lengthwise said screen.

731,316. LOADING APPARATUS.—Frank B. Metosh, Savannah, N. Y. In a coaling-barge, the combination of a coal-bin having an inclined floor, side walls inclined inward from top to bottom, inclined corner-sections and end wall, a sliding door in the inclined end wall, a lever to operate the door, and a chute to carry the coal through the door.

731,374. COAL-COMPRESSING DEVICE.—James B. Ladd, Wayne, Pa., assignor to the Semet-Solvay Company. In a coal-compressing device, means for subjecting the entire mass of coal to pressure in a closed receptacle, the bottom of which is a movable peel adapted to convey the coal into the oven.

731,395. METHOD OF CLEANSING FANS OPERATING ON BLAST-FURNACE GASES.—Benjamin H. Thwaite, Westminster, England, assignor to the Blast Furnace Power Syndicate, Limited, Westminster, England. A method of cleansing fans employed in delivering furnace-gases which consists in passing sprayed water into the fan-casing simultaneously with the admission of the gases thereby absorbing and carrying off in suspension solid matter deposited by the gases on the fan and in intermittently closing the outlet of the water after it leaves the fan-casing, whereby the level of the water is raised in the said casing until the fan rotates partially or wholly immersed in water and is thereby cleansed by means of the solution in said casing and partly by the mechanical attrition of the deposit.

731,412. METHOD OF TREATING GAS.—Olaf N. Guldlin, Fort Wayne, Ind. A method of treating coal-gas for the removal of tar, ammoniacal liquor and other by-products, and preventing loss of volatile illuminants which consists in cooling said gas and regulating said cooling operation at a temperature above 90° Fahrenheit, thereby removing part of the mechanically-suspended tar, then, by dry mechanical impact or precipitation, extracting the remaining tar.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending May 30, 1902.

12,163 of 1902. MAKING METALS ADHERE.—Siemens & Halske, Berlin, Germany. An electrical method for making deposited grains or filaments of vanadium, tantalum and niobium adhere into a solid mass without melting.

13,120 of 1902. COAL STAMP-MILL.—F. Meguin, Dillingen, Germany. Improved drop stamps for compressing small coal for coking.

25,016 of 1902. CHARGING OPEN-HEARTH FURNACES.—J. Reimer, Dusseldorf, Germany. Improvements in cranes used in charging open-hearth steel furnaces.

4,041 of 1903. STEEL CONVERTER.—B. Talbot, Harrogate, and P. Gredt, Luxembourg. Continuous process applied to bessemer converters, specially useful in treating irons high in phosphorus and low in manganese.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mr. R. J. Frecheville, of London, is at Kalgoorlie, W. A.

Mr. Charles Lammersdorf has returned to Salt Lake, Utah, from a trip to Europe.

Mr. E. L. White, of Boston, president of the Bingham Consolidated Company, is in Utah.

Mr. S. A. Parrish, manager of the Le Roi Mine at Rossland, B. C., is at Spokane, Wash.

Mr. Edwin E. Chase left Denver a few days ago on a three weeks' professional trip to Mexico.

Mr. James Dennistoun Sword, of Greenwood, B. C., has returned from a trip to Skagway, Alaska.

Mr. Edward P. Mathers, editor of *South Africa*, sailed by the *Celtic* from New York on June 25.

Mr. T. P. Rigney, a Salt Lake minnig engineer, has accepted the management of a mine in Mexico.

Mr. R. C. Kirk, of Oakland, Cal., is in New York City, having recently returned from Sinaloa, Mex.

Mr. Clarence S. Palmer, of Kansas City, Mo., has been to the Pine Creek District, Gilpin County, Colo.

Mr. J. H. Hutchison, late manager of the Trade Dollar Mine at Silver City, Idaho, has gone to Alaska.

Mr. John Brooks succeeds Mr. Kescel as superintendent of the Sheba Mill in Humboldt County, Nev.

Prof. H. M. Howe, of Columbia University, New York City, has gone abroad and will be absent for a year.

Prof. Nathan C. Grover, of the department of civil engineering of the University of Maine, has resigned.

Mr. W. H. Taylor, of Spokane, Wash., has refrom a trip to Skagway, Alaska, to look after copper interests.

Mr. Arthur Thacher, of St. Louis, Mo., has gone to Utah to examine some mining properties for Eastern clients.

W. Clayton Miller, manager of the Tiger-Poorman and the Last Chance mines in the Coeur d'Alenes, is at Spokane.

Mr. J. D. Bone has been appointed general field manager for the Case Investment Company, of Tacoma, Wash.

Mr. Paul Delvaux, of Brussels, Belgium, is at Salt Lake, Utah, in the interest of the Belgium-American Oil Syndicate.

Mr. Harrington Blauvelt, superintendent of the Cash Mine, has returend to Prescott, Ariz., from an Eastern trip.

Mr. E. E. Abercrombie, vice-president of the Boston Consolidated, is in Utah inspecting the properties of that company.

Mr. Joseph C. Kescel has been appointed superintendent of the Keith-Kearns plant, now being erected at Park City, Utah.

Mr. Bernard MacDonald, of Spokane, Wash., has been elected president of the new Society of Engineers just formed there.

Mr. A. B. Lewis, president of the Royal Gold and Copper Mining Company, has returned to Salt Lake, Utah, from New York.

Mr. W. F. Blackford, of Butte, Mont., has been appointed chief engineer of the Haggin-McCune mines at Cerro de Pasco, Peru.

Capt. H. R. Couch, of Pittsburg, Pa., is now in the employ of the Rankin Mining Company at its plant, near Weiser, Idaho.

Mr. Junsuki, Ilijima, a Japanese mining engineer, is visiting Colorado and Arizona camps studying methods of ore reduction.

Mr. Richard Eames, Jr., has returned from examining mines in Jalisco and Durango, Mex., and is at the Grand Hotel, New York.

Mr. T. J. Hoover has been appointed assistant superintendent of the Standard Consolidated Gold Mining Company, at Bodie, Cal.

Prof. H. A. Wheeler, of St. Louis, has been examining lead properties in the Franklin County District of Missouri, for St. Louis men.

Mr. H. M. Cooley, Western representative of the Sullivan Machinery Company, with headquarters at Spokane, has been in Montana recently.

Mr. E. G. Spilsbury has returned from Guanajuato, Mex., and is now in North Carolina. He expects to be in New York early next week.

Messrs. Robert de Rothschild, Conrad Echimberger and Jean Siegler, of the School of Mines, Paris, France, are now in the West studying mining methods.

Mr. D. W. Brunton has returned from Europe on the *Tunisian*, which reached Montreal June 23. He passed through New York on his way to Denver.

Mr. John K. Mackenzie, of the firm of Dickman, Mackenzie & Potter, Chicago, sailed for Europe by the *Kaiser Wilhelm II* on June 23. He will be absent two months.

Mr. Titus Ulke has been recently transferred from the position of assistant inspector to that of mechanical draftsman of the Ordnance Department, at Watervliet Arsenal, near Troy, N. Y.

Mr. Walter Felt, manager of the Model Mining Company, at McCabe, Ariz., who resigned recently, is to take charge of the Arena Copper Mining and Milling Company's property in Wyoming.

Mr. G. W. Meyers, who represents the Chrome Steel Works, of Brooklyn, N. Y., on the Pacific Coast, recently returned to San Francisco from a trip to Douglas Island and Juneau, Alaska.

Mr. J. C. Maben, president of the Sloss-Sheffield Steel and Iron Company, has returned from a 60 days' trip to Italy. He may return to Europe after the miners' convention in Alabama is over.

Dr. William B. Phillips, director of the Mineral Survey of Texas, is now examining mining property in the New York Mountains, in San Bernardino County, Cal., for the Giant Ledge Gold and Copper Company.

Mr. F. Butler has been appointed superintendent of the Utah & Eastern Copper Company, near St. George, Washington County, Utah. Mr. Butler was formerly superintendent of the Chainman Mine, at Ely, Nev.

Mr. Charles Butters, who has been spending some time on the Comstock Lode, in Nevada, is now on his way to Mexico. It is understood that he will not return to the Comstock at once, but will go from Mexico to London.

Mr. T. F. Manville sailed on the *Kaiser Wilhelm II* June 23 for London and the Continent, to be gone for two months. Mr. Manville goes to London on business in connection with the London branch of the H. W. Johns-Manville Company.

Dr. J. A. Holmes, chief of the department of mining and metallurgy of the St. Louis World's Fair, has returned to St. Louis from a prolonged Eastern trip, where he made arrangements for a very complete exhibition of the iron and steel processes and products.

Prof. Charles P. Neill, of Washington, D. C., has been appointed commissioner, as provided by the Anthracite Strike Commission, to compute and announce each month the average selling price of coal at tidewater, New York, the basis for the sliding scale of wages to be paid the miners.

Dr. F. M. Simonds and E. Z. Burns, of the firm of Simonds & Wainwright, New York City, are at present engaged in development work on a large scale on the Pacific Coast.

Mr. Joseph Hyde Pratt, of the Engineering Company of America, is on an extended trip through the West to make several examinations and to look over properties for which the Engineering Company acts in the capacity of consulting engineers.

Mr. Steven Bywater, president of the Broken Hill Mining and Milling Company, owning the Wilcox Mine, near Ymir, B. C., is in Spokane, Wash. Mr. Cornelius Shields, of the Lake Superior Consolidated Company, is vice-president of the company, and Messrs. L. L. Tower, Philip White and John F. Burns are directors.

Mr. William Burlingham has accepted an appointment as chief engine designer with the B. F. Sturtevant Company, of Hyde Park, Mass., resigning a position in the United States Inspection Office, with the William R. Trigg Company, of Richmond, Va. Mr. Burlingham has previously been associated with the Bath Iron Works, the General Electric Company, the Southwark Machine and Foundry Company, and the Newport News Shipbuilding and Dry Dock Company. He is a graduate of the Worcester Polytechnic Institute.

Mr. Bailey Willis, it is stated, will be leader of the Carnegie Geological Expedition to China, which has as its object the investigation of the Cambrian rocks of that country. He will be assisted by Mr. Eliot Blackwelder, of the University of Chicago. Mr. Willis expects to leave Washington in July, to attend the International Congress of Geologists at Vienna, and to go to China by way of Siberia. Dr. H. Foster Bain, who has accepted an appointment as geologist on the United States Geological Survey, during Mr. Willis' absence in China, will be acting editor of geologic folios. During the coming summer he will investigate the lead and zinc deposits in southern and northwestern Illinois.

OBITUARY.

David Houston, the oldest member of the New York Metal Exchange, died on June 17 at his residence, East Orange, N. J., from a stroke of paralysis. Mr. Houston was born in Glasgow, Scotland, 80 years ago. For more than 40 years he was in the metal brokerage business in New York. He is survived by one son, Robert J. Houston.

James Mactear, who died in England recently of heart failure, was well known as a chemical, metallurgical and mining expert and civil engineer, having at one time been consulting adviser to the Johannesburg Chamber of Mines. Mr. Mactear, who was in his 58th year, was a fellow of the Institute of Chemistry, a fellow of the Chemical Society, a fellow of the Royal Society (Edinburgh), a member of the Institute of Mechanical Engineers, and a past president of the Institution of Mining and Metallurgy. He was formerly a partner in Sir Charles Tennant & Co., of Glasgow.

SOCIETIES AND TECHNICAL SCHOOLS.

THOMAS S. CLARKSON SCHOOL OF TECHNOLOGY.—This school at Potsdam, N. Y., will start a summer session this year. The session will open July 6 and continue six weeks. Summer courses are offered in mathematics, physics, chemistry, electricity and electrical engineering and domestic science and economy.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—The Society will hold its annual convention at Niagara Falls, N. Y., July 29-July 3. Visits can be paid to points of historical interest and excursions will be made to various manufacturing and power plants in Niagara Falls and Buffalo. Headquarters will be at the Cataract and International hotels.

FARADAY SOCIETY.—This society has for its object the promotion of the study of electro-chemistry, electro-metallurgy, chemical physics, metallography and kindred subjects. J. W. Swan is president of the society, and the vice-presidents are Prof. A. Crum Brown, Lord Kelvin, Sir Oliver T. Lodge, Ludwig Mond, Lord Rayleigh, Alexander Siemens and James Swinburne.

MONTANA SOCIETY OF ENGINEERS.—A regular monthly meeting was held on May 9, with Vice-President Moulthrop in the chair. A quorum present. Owing to the unavoidable absence of the author, Mr. M. H. Gerry's paper on the 50,000-volt transmission plant and system of the Missouri River Power Company was read by the Secretary, after which the details of the plant were fully explained by Mr. W. L. Miller, the resident representative of the company in Butte. The various phases of this and other electric power transmission systems were discussed by Messrs. Hebgen, Sickles, Magnus, Traphagen and others.

INDUSTRIAL NOTES.

The New York offices of the St. Joseph Lead Company are now at 5 Nassau Street.

The Otis Elevator Company has removed its New York offices from the Empire Building to the Battery Place Building.

The Lidgerwood Manufacturing Company, of New York City, recently secured an order for hoisting engines for use in the Rand District, South Africa.

The Salt Lake branch of the Mine and Smelter Supply Company has secured the contract for the machinery for the Kearns-Kieth Mill, to be erected at Park City, Utah.

The Litchfield Foundry and Machine Company, of Litchfield, Ill., recently secured an order for an engine from the Mexican Coal and Coke Company, of Los Esperanzas, Mex.

The engineering firm of Jones & Jacobs, of Salt Lake City, Utah, recently secured an order for a 35-h.p. and a 70-h.p. Ideal engine for an electric plant at the Nampa Mine, at Bingham.

The Carnegie Steel Company will add five more open-hearth furnaces to its South Sharon, Pa., plant, making a total of 17, and bringing the plant next in size to the Homestead, which has 24 furnaces.

The Pennsylvania Portland Cement Company recently organized with $1,500,000 capital, will erect cement works of an annual capacity of 1,000,000 bbls., near New Castle, Pa. George Greer, of the American Tin Plate Company, is president.

The Sullivan Machinery Company has placed the Montana agency with James G. Graham, of Butte. Mr. Graham has opened offices at 110 North Wyoming Street, opposite the Thornton Hotel. A full line of Sullivan drills, repair, and other machinery will be carried in stock.

The Virginia Iron, Coal and Coke Company and the Southwestern Railway Company will remove their general offices from Bradford, Va., to Bristol, Tenn., about July 1. H. H. McHary, of New York City, is president of the companies, while J. B. Newton, formerly of Knoxville, Tenn., is vice-president and general manager.

At the recent meeting of the Reading Company Joseph S. Harris presided, and President Baer voted the stock of the voting trust. It was expected that L. F. Loree, president of the Baltimore & Ohio, would be elected to the board, but the directors re-elected were: George F. Baer, Joseph S. Harris, John Lowber Welsh, George C. Thomas, Henry A. Dupont, Henry P. McKean, Samuel Dickson, Charles Steele and H. McK. Twombly.

The C. W. Hunt Company, of West New Brighton, Staten Island, N. Y., has shipped what will probably be the first electric locomotive to enter Africa. The locomotive was shipped to the order of the De Beers Consolidated Mines, Limited, for use on one of its plants. The locomotive is of the latest storage battery type, standard throughout, with the exception of the gauge of the wheels, which is special, to suit the track now in use at the mines.

The Colorado Power and Irrigation Company has been organized with a capital stock of $5,000,000. The company intends to erect a large plant at Shoshone Falls, about 9 miles above Glenwood Springs. about 40 De Remer waterwheels will be used, and 20,000-h.p. generated. A number of contracts for power and light have already been arranged for at Leadville, 65 miles east, and at Grand Junction, 90 miles west, also at intermediate points. The company may eventually extend its transmission lines to Denver, the direct distance being only about 150 miles.

William B. Scaife & Sons Company, of Pittsburg, Pa., sole manufacturers of the We-Fu-Go and Scaife water softening and purifying systems, have found it necessary to build an addition to their present plant at Oakmont, Pa., to accommodate increased business, and have just completed a new shop 60 ft. wide by 100 ft. long, equipped with the latest machinery, for manufacturing the We-Fu-Go and Scaife systems. They have at the present time systems aggregating 95,000 h.p., under construction for steam boiler plants, in addition to plants for softening water to be used in manufacturing processes.

At the annual meetings of the Duluth and Iron Range Railroad and the Minnesota Iron Company in Duluth, June 10, the Minnesota Iron Company officers and directors elected were: T. F. Cole, president; Dr. N. L. Hulst, vice-president; W. J. Olcott, general manager; C. E. Schneider, treasurer; W. M. Jeffrey, auditor; J. L. Mullin, assistant auditor; G. D. Swift, secretary and assistant treasurer; these, with E. H. Gary, N. T. Hulst, A. H. Veile, C. M. Schwab and W. W. Watson, being directors. For the Duluth & Iron Range the following were elected directors and officers: F. E. House, president; A. A. Veile, vice-president; H. Johnson, secretary; C. P. Coffin, treasurer; Thomas Murray, assistant secretar yand treasurer; these, with E. H. Gary, T. F. Cole, N. T. Hulst, N. H. White and Robert Angst, being directors.

A partial list of the engine sales made by the Allis-Chalmers Company, of Chicago, Ill., during May is as follows: Northwestern Elevated Railway Company, Chicago, Ill., 33-in. and 70 by 36-in. heavy duty, horizontal cross-compound direct-coupled Reynolds Corliss engine; Takata & Co., New York City, 15 by 36-in. heavy duty horizontal direct-coupled Reynolds Corliss engine; Cananea Consolidated Copper Company, Salt Lake City, Utah, 12 by 30-in. heavy duty Reynolds Corliss engine; Delaware & Hudson Company, Scranton, Pa., two 16 by 36-in. girder frame, Reynolds Corliss engines; Illinois Steel Company, Chicago, Ill., two 24 and 60 by 48-in. duplex combined vertical and horizontal direct-coupled Reynolds Corliss engines; Cananea Consolidated Copper Company, New York City, 10 and 30 by 36-in. tandem compound heavy duty Reynolds Corliss engine.

TRADE CATALOGUES.

"The Source of Electric Light," a little 16-page pamphlet published by the Crocker-Wheeler Company, of Ampere, N. J., describes the company's direct-current dynamos.

Rivets for tank and sheet iron, boiler and structural work are priced in the circular sent out by the Allegheny Forging Company, of Pittsburg, Pa. The company states that it guarantees its rivets to be first-class in quality and workmanship.

Catalogue No. 8, published by the C. O. Bartlett & Snow Company, of Cleveland, O., describes the company's paint machinery, including Triumph mixers, kettles, paint coolers, mills, crushers, crushing-rolls, disintegrators, pulverizing cylinders, etc. The company's concrete mixer weighs about 2,500 lbs., and requires about 10 h.p.

The Charles Efros Company, of Bayonne, N. J., is sending out printed matter calling attention to its Bayonne aluminum steel storage tanks, shipped knocked down. These tanks are made regularly in 10 sizes, from 60 to 324 bbls. capacity, and are stated to be acid, oil and grease proof. The company states that during a recent month it shipped over 1,000,000 gals. capacity.

Eugene Dietzgen & Co., with offices in Chicago, San Francisco and New Orleans, have issued an illustrated description and price-list of Richter's draughting instruments. The points of superiority claimed for these instruments include an absolutely steady joint; movable round steel points that can be replaced quickly and at little cost on all dividers and compasses; also a never-failing straightening device, while on the outside of compass legs are no screws to hold points and to obstruct the view.

A 30-page pamphlet, illustrated with numerous fine cuts, and entitled "Electricity in Mining," is issued by the Westinghouse Electric and Manufacturing Company, of Pittsburg. The pamphlet describes the use of Baldwin-Westinghouse electric locomotives, compared with compressed air locomotive or wire rope haulage, also the use of the company's type F motors for hoisting and the operation of mine fans and blowers by Westinghouse type C motors. The pamphlet also mentions the use of the Westinghouse type C and type F motors on gold placer dredges.

The A. Leschen & Sons Rope Company, of St. Louis, Mo., which has branch offices in New York, Chicago, Denver and San Francisco, has issued price-list No. 24, an 80-page pamphlet, containing description and prices of its wire and manila rope, wire-rope fixtures, aerial tramways, etc. The company calls particular attention to its Hercules brand flattened strand wire-ropes, claimed to be free from all tendency to spin or kink. The ropes are made with ordinary lay, or with Lang's lay, and crucible cast steel or Swede's iron wire is used. The rope is recommended for mine inclines and for underground haulage. The company also calls attention to its Hercules wire-rope, with round wire drawn from a special steel, recommended for quarries and mines, and for contractors and bridge builders. The company also makes galvanized wire-rope for vessel rigging and suspension bridges.

SPECIAL CORRESPONDENCE

Denver. June 20.

(From Our Special Correspondent.)

The American Smelting and Refining Company announced on June 17 that lead would be bought at the rate of $3.50 per 100 lbs. This is the second decline since the recent advance and practically annuls the auvantages gained therefrom. Over production is the reason given.

The roasting capacity of the Ohio & Colorado Smelting and Refining Company's plant at Salida is being increased from 150 tons to 300 tons. One unit will be in operation by July 15, but the whole will not be completed before September 1. The Leadville pyritic plant of the auxiliary company, the Republic Smelting and Reduction Company, will be in operation before long, and may be enlarged by three more lead stacks.

The Colorado Power and Irrigation Company just organized, purposes to utilize Shoshone Falls, 9 miles east of Glenwood Springs. The falls are said to show a minimum of 20,000 h.p., and by a system of storage reservoirs the company expects to secure 40,000 h.p. The company intends to begin work first on a plant to furnish 6,000 h.p. to be completed within 9 months, and then on a plant to furnish 20,000 h.p., to be completed within two years. The company says it expects to furnish Leadville and other mining districts with power at a cost of 50 per cent less than present cost of steam.

The officers and directors of the company are: President, Albert Sherwin, Leadville; vice-president, J. R. De Remer, Glenwood; secretary, E. E. Lucas, Glenwood Springs; treasurer, C. C. Parks, Glenwood Springs; general manager, L. W. Beard, Denver; chief engineer, F. H. Whiting, Denver; directors, these and C. C. Hendrie, Denver, and J. C. Beard, Decorah, Ia.

The convention of the Western Federation of Miners, recently closed in Denver, having professed to reply to the recent sermon of the Catholic bishop of Colorado, condemning the re-adoption of the Socialist platform by the Federation, the bishop retorted on June 14 with an even more scathing denunciation of the position taken by the Federation, which he describes as "advocating the wholesale spoliation of all private property in the name of Socialism," and a "wild and reckless and revolutionary appeal to the slums of humanity." He said that "the Western Federation of Miners is trifling with the common sense of the public and makes itself ridiculous." He declared that the people "cannot afford to be deluded by the boasted Socialistic collective administration, composed of all the hoodlums of the land, which Socialism will invite to govern the Socialistic State."

San Francisco. June 17.

(From Our Special Correspondent.)

The miners' strike at Randsburg, in Kern County, now on, is a pretty hard one for that section. The owners of the Yellow Aster declare the shut down will be permanent before they give in to the demands. Other mines and mills have also closed down. The Yellow Aster is a dry mine, and little damage will be done by a shut down. The union contends that while the miners get $3 per day the muckers get only $2.50. The demand is for $3.50 per day for miners and $3 for muckers. The Yellow Aster management declines to recognize the union at all. A number of the miners have left the camp. The mines affected are the Yellow Aster and the Baltic. Around Mohave, in the same county, a number of miners have quit and a "sympathetic strike" is expected. The quarrymen employed by the Colton Marble Company, in San Bernardino County, have quit work, asking for increased pay. They are getting out marble for the contractors on the new Post Office at San Francisco. They have been getting $2.25 for a 10-hour day, and ask $2.50 for an 8-hour day.

A "gusher" last week in a new oil well at Santa Maria, Santa Barbara County, is a good indication for what is practically a new oil field. The well is expected to yield about 600 bbls. daily. In Kern County there is renewed interest in oil drilling. One company has started to drill 50 new wells in its territory in the Kern River field. The Sunset Railroad is to be extended to Maricopa in the heart of the oil fields.

The smelting plant formerly owned by the Davis Smelting Company at Oro Grande, San Bernardino County, has been purchased by the Southwestern Smelting Company, of Los Angeles, and will start again after a period of idleness. It is a custom smelter of 80 tons capacity. There are a number of claims in that region now shipping to smelters at great distances. E. H. Grasty, Jr., Warren Brown and Wm. H. Kerr, of Los Angeles, are interested.

Chain Island, at the confluence of the Sacramento and San Joaquin rivers, near Collinsville, is to be dug out for the gold supposed to be in the soil. The Government has given permission, compelling the operators, however, to take the earth inshore and impound it behind a dam. If gold enough to pay is found many thousands of acres of island land in that section will doubtless be mined in the same way.

At the last meeting of the Anti-Debris Association, at Sacramento, June 16, the manager brought charges against the Cleveland mines, near Scales; Brownsville and Duncan mines ,at New York Flat; Badger Hill, Relief Hill, Columbia and others on the San Juan Ridge, and some others. The attorney was directed to begin suits against the offending mines. None of these properties are runnig without permits from the Government Debris Commission. Under present laws the California Debris Commission pases upon the impounding works imposed on these mines before a permit to mine by hydraulic method is granted, and has the power to shut a mine down if any damage is done by the debris escaping.

The absorption of the four California powder manufacturing companies by the $50,000,000 corporation recently organized by the Du Ponts, of Wilmington, Del., is practically completed. The present companies are not to lose their identity or reduce their output, but the cost of manufacture will be lowered, and the expenses of some agents and the gratuities to superintendents and other large buyers will be done away with. While all the companies have not yet come to definite terms, it is expected to be a matter of only a few weeks before the transaction will be completed.

The oil in the big pipe line of the Standard Oil Company does not run half as fast as expected, and is not yet half way from Bakersfield to Point Richmond. The company, however, asserts that the $3,000,000 pipe line is not an experiment, but a certainty, even with heavy California oil, with its asphalt base.

Two or three of the trustees of the California State Mining Bureau have resigned within a week, including Senator William C. Ralston, the president of the board. The reason stated is that they will be required to make a creditable exhibit of the California mineral industry at the St. Louis Exhibition, and they think the Commissioners appointed by the Governor are mainly interested in the horticultural and agricultural features, and will make no definite allowance for a mining exhibit. The State Mining Bureau has a large permanent exhibit of ores and minerals already, but does not want it removed from the museum. The State Mineralogist is charged by the act appro-

priating money for the St. Louis fair to prepare a mining exhibit for the State Commission, but the trustees think they also will be responsible, so have resigned.

Spokane, Wash. June 18.

(From Our Special Correspondent.)

The Republic Consolidated Mining Company, owning a gold mine at Republic, is in a precarious condition. Several months ago, when the mine closed through scarcity of ore and pressure of debts, Eastern Canadians, who control the company, planned to issue $300,000 worth of bonds. The debts were about $200,000, so $100,000 would be for development. It was hoped that careful prospecting would pick up the bonanza ore-body which Patrick Clark, of Spokane, had worked successfully in the upper levels. A number of the creditors agreed to accept bonds in settlement, if reports showed that the prospects of the mine warranted further expenditure. Patrick Clark, of Spokane, was induced by the Eastern Canadian purchasers to become president again, and put a force exploring the mine. Later S. A. Parrish,, manager of the Le Roi at Rossland, B. C., made a careful examination, and his reports and those of Mr. Clark have been submitted to the Canadian stockholders. It is understood that the outlook is so gloomy that the company will not try to float the bonds. The prospect is that the property will be taken over by the creditors, including some large Canadian banks. There seems no likelihood that any equity will remain for the stockholders, and the shares are likely to be wiped out.

The Republic Power and Cyaniding Company, a subsidiary corporation which invested $600,000 in the cyanide mill to handle Republic ore, is even in worse shape. There is a bond issue of $300,000 outstanding against the property. Some time ago Secretary Landskaile, of the Power Company, was appointed assignee of the corporation, to protect all the creditors against judgments which it was feared some of the banks would secure. The Republic was discovered about six years ago, and in the upper levels ore running $400 a ton was shipped by the car-loads. The mine was sold to Robert Jaffray, of Toronto; A. W. Ayres, of Montreal, and other Canadians, who capitalized it for $3,500,000, and the stock sold readily above par.

E. L. Tate, of the Quilp Mining Company, at Republic, reports that shipments are at the rate of 100 tons a day, the ore going to the Granby Smelter at Grand Forks, B. C., and the Tacoma Smelter. Since shipments began last October the Quilp has produced 8,000 tons, of which 6,000 tons average $13.76, and about 4,000 tons went $15.47. About one-third of the values are in silver. At the 620-ft. level a streak 2½ ft. wide, which has been drifted upon 90 ft., shows much native silver.

Victoria, B. C. June 18.

(From Our Special Correspondent.)

The mining situation in British Columbia has improved considerably of late. Production, except in the silver-lead camps, is maintained at perhaps 25 per cent over last year's shipments. More transfers of mining property were recorded in May than in any month for a year past. The local share market shows signs of returning life, and many new strikes have been reported. Possibly the most important deal is the transfer of a three-tenths interest by J. Boscowitz, of Victoria, to G. H. Robinson, of Salt Lake, Utah, in the Britannia coper property on Howe Sound. The consideration is said to have been around $150,000. Arrangements are being made, it is understood, to equip the mine on a large scale. The ore is generally low grade chalcopyrite, probably not averaging over $8 per ton at the present price of copper. The favorable situation of the property and other conditions permit ore of this grade being profitably mined. The deposits are very large, and the Britannia Company may establish its own matting plant, but the intention is to ship the ore to the Crofton Smelter at Osborne Bay.

The application of the Elmore process to the low-grade Rossland ores is anticipated with much interest, the experimental tests having given good results. Meanwhile some difficulty has arisen in consequence of the War Eagle and Center Star companies notifying the Le Roi No. 2 that these corporations control by prior record all the available water in the creeks from which it is proposed to obtain a supply for the new concentrator. As the corporations in question, however, are not utilizing this water, nor is there any likelihood of their requiring it for many years, the notification is not taken very seriously, though it has raised much unnecessary ill-feeling.

A somewhat better grade ore has recently been encountered at the 300-ft. level in the War Eagle; the values in the new find at the 650 level east in the Center Star continues satisfactory, and the Kootenay and Velvet have increased shipments. Production for the five months ending May 30 were as follows:

	Tons.
Le Roi	75,334
Centre Star	34,618
War Eagle	23,445
Le Roi No. 2	11,117
White Bear	267
Velvet	2,626
O. K.	25
Giant	335
Kootenay	1,265
Homestake	90
Total	149,152

Two 30-drill compressors have been installed at the Granby mines, in the Boundary District, and are in commission.

During the week operations were resumed at the Athelstan, in Wellington Camp, owned by a Spokane company. The property made small shipments in 1900 and 1901. The ore will go to the Sunset Smelter at Boundary Falls. The Big Copper and the King Solomon in Copper Camp will start shipments when a new railway spur is furnished. The ore is oxide of copper and copper glance, of fair grade, and there is said to be a reasonable tonnage in sight. The mines in the granite belt, near Greenwood, are beginning to attract attention from the high values of the ore compared with the general average of the Boundary mines product. Smelter returns on 11, 10 to 20-ton parcels of ore from the Providence, show gross values of from $100 to $250 per ton in gold, silver and lead. The gold values are in the form of tellurides. The last payment of $12,500 on the Providence was made last week.

London. June 10.

(From Our Special Correspondent.)

In my letter last week I mentioned that the Etruscan Copper Estates, Limited, had announced the commencement of dressing operations at the rate of 1,500 tons a week. It was naturally assumed by myself and by everybody else that the ores so treated were copper ores. It turns out, however, that they are lead-zinc ores, but at that point our information once more ceases. We are not told whether the lead and zinc are being separated entirely, or whether the lead or zinc contents, as the case may be, are being dressed down sufficiently to make the ore available for zinc or lead smelting. It seems a remarkable thing that, after so much advertisement of the wonderful stores of rich copper ore in sight, actual operations should commence on zinc-lead ores. This, however, is only another example of the series of mysteries in connection with the management of this mine.

An echo of the Whitaker Wright collapse has been heard in the mining market this week. Just before the London & Globe Finance Corporation came to grief, it had floated two companies called the Moorlort Gold-fields and the Loddon Valley Gold-fields, Limited, to acquire properties at Moorlort, Victoria. These properties have now been bought from the official receiver in bankruptcy for a sum of £50,000 which is only a fraction of what was paid originally by the subscribers in 1900. A new company has been formed, called the London & Globe Deep Leads Assets, Limited, to acquire them, and some £50,000 will be provided by underwriters for working capital. These properties are situated in a district where auriferous river beds have been filled by volcanic matter. A large number of properties in the district have been worked at a profit to local owners, so there is no reason why the new company should not be successful. The management is in the hands of Messrs. Bewick, Moreing & Co., and Mr. Ernest Lidgey, who is a specialist on deep leads, has reported on the properties.

It seems to be the fate of Englishmen to get hold of refractory propositions from Mexico. I have recently mentioned quite a number of such cases. This week the troubles of the Avino Mines of Mexico, Limited, have been before the public again. It will be remembered that the company was floated in the early part of 1899, under the auspices of Mr. Frank Gardner, to acquire properties, at Avino, Durango. An extensive concentrating plant was erected, for the purpose of separating the precious metals (chiefly silver), and the copper, but unfortunately the plant was not suitable for the ore. The mine is a large one, and the ore in sight is reckoned by millions. The managers made the error of erecting a plant before the average character of the ore was ascertained. When the error was discovered, the advice of Mr. Ottokar Hofmann was sought, and his experience with this kind of ore has been extremely useful to the company. He recommended the lixiviation process that has been used on similar Mexican ores and a plant is now in operation treating 70 tons a day, with an extension to 100 tons in course of construction. Here and there the ore is sufficiently rich to make it suitable for shipping to smelters, and in some places it will concentrate, the resulting concentrates being also sold to smelters. The bulk of the ore, however, is of comparatively low grade, and will be best treated by lixiviation on the spot on a large scale. The company was naturally short of the funds necessary to change the metallurgical operations, so at the beginning of the present year the company was reconstructed with a liability of 2s. 6d. per £1 share. The nominal capital of the company is £1,000,000, of which 917,110 shares have been taken up in the reconstruction. The company is now well in funds, and should be able to provide plant to treat 500 tons a day, and to operate it on a paying basis.

The report of the Cuban Mining and Development Company, which has just made its appearance, shows that the company has not got much further than prospecting so far. The properties consist chiefly of some old copper workings in the province of Pinar del Rio, Cuba, but town sites, petroleum lands, and iron properties have also been acquired. They were introduced in England by Mr. Federico Kohly, of Cuba. Some £50,000 was subscribed for the purpose of purchasing and developing these properties and, as this money has already been nearly spent, it is intended to raise further working capital by the sale to another company of much of the town site and other lands. The old copper workings have been very fully prospected by Mr. F. J. Rich, of Cornwall, son of Mr. William Rich, who was for so long connected with the Rio Tinto. The workings do not appear to have been abandoned by the previous owners on account of their exhaustion, for there is plenty of ore in sight. It seems, however, to occur irregularly, and this may have been the cause of their abandonment, as the original owners would hardly have a great deal of capital at their backs. Whether the properties can be made to pay under modern management remains to be seen.

San Luis Potosi, Mex. June 10.

(From Our Special Correspondent.)

Imports of coal from Alabama are increasing rapidly, and passing imports from other places. Alabama coal is used principally by the railroads; but the Tehuantepec National Railroad, traversing the Isthmus, and the states of Vera Cruz and Oaxaca has ordered oil burners for all its new engines, and expects to obtain its oil locally. In Oaxaca, near the Mogane station of the Tehuantepec road, F. H. Woodhouse has started opening a deposit of bessemer iron ore, which he will ship by water from Coatzacoalcos to one of the large steel companies of the United States, with which it is said he has a contract for 100 tons a day for 10 years. Modesto Ugal is preparing to erect a 500-ton stamp mill in Tamazota at the Dios y Trabajo mines, to treat rich gold ore, recently struck, and for custom work. At San Sebastian, Mascote District, negotiations are pending for sale of the Tajo mines, for which $250,000 has been refused.

In the State of Mexico, the Aurora y Anexas, a company organized by Americans residing in Mexico, capitalized at $360,000, is developing 175 pertinencias held in El Oro, with H. C. Sandifer as manager.

In Michoacan, the Santiago y Anexas, of Tlalpujahua, has been sold to an American company, and the first payment made. The figures are not given out. In this camp, it is claimed, the Venture Corporation has invested $6,000,000 in mines, buying the San Francisco and Escuadra for $1,000,000 each, and the Izanal at $150,000. The price of the Natividad is considered too high.

In Guanajuato, in the Peregrinas District, La Fortuna Mine is said to have been sold, as well as the Bolavitos. At El Cubo, near Guanajuato, a 30-stamp mill is being erected by El Cubo Mining and Milling Company, the reorganized International Mining and Milling Company. On Guanajuato River, E. Gibbon Spillsbury has examined the mineral rights held by G. W. Bryant, of Guanajuato, and plans are being drawn for the erection of a dredge and concentrator for the treatment of amalgam, etc., which have been gathering in the river for centuries from the patios of Guanajuato.

In Zacatecas a rich strike is reported in La Calderona. Powerful pumps have been installed in Los Reyes Mines, and the water will be used for irrigations. A number of Colorado men are after the Pinos Altos mines, of Ocampo, one of the largest low-grade properties of the State, with a record of $14,000,000. A concession, exempting it from taxation for 10 years, has been granted the Zacatecas Smelting Company, capital of $1,500,000, that is to erect a smelter in the City of Zacatecas.

In Durango, the Mexican National Iron and Steel Company, has furnished the Proano mines, of Sr. Ortego, at Fresillo, Zacatecas, with a 100-ton crushing plant, and is figuring on a 500-ton plant for Santa Barbara, Chihuahua. Considerable work is being done on the Nayas coal fields.

In Chihuahua, the mines recently bought by the Western Exploration Company are being opened on a large scale, and 100 stamps are being added to the mill. At Batopilas the recent rich strikes in the 400-ft. level of the Providencia, have led to the sale, by Arthur Shepard, of the Chiquito property for the reported price of $250,000, to an American company, which is also after the Tal Vez.

In Sonora, the Alonzo Morgada Mine, 60 miles from Carlo Station, of the Sonora Railroad, has been sold by Luis H. Echevaria to J. R. Archibald for $25,000, gold; Americans have closed a deal for La Vubusa copper mines in the Sahuaripe District. The Colorado Fuel and Iron Company, of Denver, is after a group of iron mines on Cedros River, in the Sahua-

ripe District, owned by Messrs. Frank Crauz, E. F. Dumble and J. A. Naugel, who are reported asking $750,000 for the property. In the Sierra de Cobre, owned by Phelps, Dodge & Co., another strike is reported.

The Mexican Government has made Naco the port of entry for Sonora instead of Nogales, and a smelter is contemplated at Naco to treat Mexican ores. Reports of rich gold strikes come from the San Jose Mountains; at Tubutana, the Sonora Mining and Milling Comapny, with 400 pertinencias in the Mv-Kinley, Cobre and Penasco Suemado copper properties, is spending $100,000, gold, in new machinery.

Notwithstanding the upward tendency of silver during the week exchange on New York went up, reaching 237¾, because of the forced purchases by some of those who have been holding off for several weeks. The favorite mining stocks of the week were Old Abe, of Tlalpujahua, which sold at $50 for $100 par, with only $10 paid in, and the Victoria y Anexas, of El Oro, which jumped from $200 to $250. Of the other stocks, Monterey Iron and Steel sold for $111; Dos Estrellas, $2,400; Cinco Senores, $185; La Paz, Matehuala, $680; Candaleria de Rinos, $300; San Rafael y Anexas, $1,100; Santa Gertrudes, $80; Sorpresa, $320; Amistad y Concordia, $76.

Perth, W. A. May 11.

(From Our Special Correspondent.)

The gold yield of Western Australia for April is reported by the Mines Department as follows: Gold exported, 86,987 oz.; received at mint, 121,639 oz.; total, 208,626.9 oz.; equal to 176,813.7 fine oz., which at £3 12s. per oz. is equal to £751,056. The previous best record was 210,450 oz. in January last. The total gold yield of this State since records were first kept in 1885 has been 10,572,034 oz.; valued at £39,-821,572.

Northwest Fields.—These fields are languishing for lack of transport from the various ports to the undoubtedly rich deposits known to be there. It was intended last year to permit private capital to construct a line from Port Headland to Marble Bar, but the matter is apparently dropped, as the Government is largely influenced by the labor party that opposes any but State owned lines.

Greenbushes Tin Field.—Crushings at the public battery have been done as follows: 37 tons for 2,061 lbs. of tin; 11 tons for 566 lbs.

South Australia.—The latest reports of the Arltunga field are more hopeful. Many mining men have visited the field, and report fairly well as to prospects, but the field at present is too inaccessible for ordinary rates on goods, and until the Northern Trans-Continental Railway is constructed cannot hope to attract much attention.

Auckland, N. Z. May 27.

(From Our Special Correspondent.)

Gold and Silver Exports.—During April this colony exported 29,646 oz. of gold, valued at £111,738 ($558,690), and 17,053 oz. of silver, valued at £6,971 ($34,855). For the first four months of this year the total export of gold was 147,753 oz., valued at £561,944 ($2,809,720).

Reefton Mines.—The April returns of the Reefton mines were: Progress Mines, 4,885 tons for £9,418 ($47,090); Golden Fleece Mine, 1,240 tons for £2,291 ($11,455); and the Wealth of Nations, 1,026 tons for £1,295 ($6,475). The total yield of the group was £13,004 ($65,020) from 7,151 tons.

Hauraki Gold-field.—The mines in the Ohinemuri section continue to give excellent results, but at Thames the industry is very depressed, and at Coromandel it is by no means flourishing. During the past month the chief returns were: Waihi, £53,855 ($269,275) from 19,214 tons; New Zealand Crown, £9,395 ($46,975) from 3,072 tons; Talisman, £6,244 ($31,220) from $3,202 tons; Woodstock, £5,500 ($27,500) from 3,069 tons; Komata Reefs, £2,900 ($14,500) from 1,080 tons; Tairua Broken Hills, £2,040 ($10,200) from 600 tons; Bunker's Hill, £1,690 ($8,450) from 40 loads of general ore, and a parcel of picked stone. The Talisman Company gives its working costs for the month as £4,696 15s. 10d., equal to £1 9s. 4d. (about $7.04) per ton. The average return per ton was £1 19s. (about $9.36), and the profit, £1,547, equal to 9s. 8d. ($2.32) per ton.

The Waihi Company's return is a record, the previous best being last February's, of £53,641 from 18,-699 tons. During the first four months of this year the company has obtained bullion to the value of £210,647, so that at this rate the total output for the year will considerably exceed £600,000 ($3,000,000), a sum not far behind the total annual production of gold in the colony some 14 years ago.

The Woodstocks Company's return is a final one for the present, the battery being closed for lack of payable ore. Almost the only work now going on in the mine is prospecting in the lower levels by the diamond drill. Several holes are being bored, principally in the hope of striking the Crown Reef. The country rock is somewhat broken, and none of the holes has reached the desired depth.

Waitekauri Company.—Fire recently destroyed the engine shed at this company's No. 1 shaft, the boilers, winding and pumping engines, etc., being almost entirely reduced to scrap iron. The loss was £3,000 ($15,000).

Hardy's Premier Mine.—At Waiorongomai, near Te Aroha, where immense bodies of low-grade ores exist, rather important developments have lately taken place, especially in this mine. Since E. H. Hardy acquired possession, 4,061 tons of ore from the main reef have been treated for a return of £10,403 ($52,-015), equal to £2 11s. 3d. ($12.40) per ton. The big reef can be traced for miles, and is in places over 100 ft. thick. In the Premier Mine payable ore occurs in bands from 4 to 12 ft. wide. Since last January 511 tons of quartz have been treated for bullion and concentrates worth £2,176 ($10,880), equal to £4 5s. 2d. (nearly $21) per ton, and a large quantity of equally good ore is in sight. Mr. Hardy is also developing a new find, known as the Big Blow Reef.

GENERAL MINING NEWS.

Pennsylvania Railroad Company.—Coal and coke shipments east of Pittsburg and Erie, for the week ending June 6, and the year to date, were as follows, in short tons:

	Week.	Jan. to June 6.
Anthracite	67,828	1,956,935
Bituminous	522,880	11,641,066
Coke	184,309	4,282,070
Total	775,017	17,880,071

Compared with the corresponding period last year, there is an increase of 399,651 tons anthracite; 1,083,-116 tons bituminous, and 135,903 tons coke; or 1,-618,670 tons, 9.4 per cent.

ALASKA.

Alaska Copper Company.—This company intends erecting a smelter on Copper Island, and is said to have purchased machinery for the same to the value of about $50,000. The ore has formerly been shipped to Tacoma, Wash. Major R. W. A. Simmons represents the Pittsburg, Pa., stockholders of the company.

Alaska Petroleum and Coal Company.—This Seattle, Wash., concern is in litigation. C. E. Crockett, a stockholder, asks for a receiver. The capital is $5,-000,000, with debts and liabilities estimated at about $1,000,000.

ARIZONA.

(From Our Special Correspondent.)

It is understood that many mine owners have agreed ot employ no men who cannot speak English well and to do away with peon labor. This rule is in effect on the Mother Lode in California at many mines.

COCHISE COUNTY.

(From Our Special Correspondent.)

Calumet & Arizona.—The May output of the smelterts was 2,130,000 lbs. copper. No. 1 furnace is working badly, and will be blown out as soon as No. 3 is ready. The capital stock is $2,000,000, in $10 shares. A second shaft, to be called the Oliver, is under way some 2,500 ft. south from the Mag shaft, with which it will be connected. With this shaft completed and openings made into ore, a second furnace plant, similar to the present, will be erected. The two shafts and furnace plants will give a capacity for about 1,000 tons a day.

Calumet & Pittsburg.—This property is owned by practically the same persons owning the Calumet & Arizona. Water has caused delay, as the pumping plants have twice proved inadequate. Vein matter and leached ore have been cut, and drifts have been run some distance in low-grade copper.

Pittsburg & Duluth.—The 3-compartment shaft, which was started about March 1, is down 260 ft. New machinery for more rapid deep sinking is being installed.

GILA COUNTY.

Old Dominion.—Matters are reported running smoothly at Globe. The company complied with the 8-hour law without making any reduction in wages, About 200 men are employed. The new shaft is down 197 ft. Grading for the new reduction works and railroad is being pushed. The smelter is making the usual output.

GRAHAM COUNTY.

(From Our Special Correspondent.)

Arizona Copper Company.—The production of copper for May was equivalent to 1,338 short tons.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Queen Bee.—This mine, at Mineral Park, is working but two men, the remainder have quit because of the 8-hour law. The company offers 35c. an hour for 8 hours' work.

Paymaster.—This mine, at Mineral Park, under bond and lease to the Chloride Gold Mining Company, has its main shaft down 400 ft.

Samoa.—This mine, near Sherman's Peak, in the Cerbat range, belonging to the Chloride Gold Mining Company, of which L. Hoffman is superintendent, is reported in good silver ore on its 300-ft. workings.

Tennessee.—A new body of rich ore has been opened in a drift on the 600-ft. level of this mine at Chloride. The 100-ton mill is running on full time, and shipments of concentrates are regular.

PIMA CUUNTY.

Del Monte.—This group of mines in the Santa Catalina Mountains, about 35 miles east of Tucson, is reported sold for $250,000. It was owned and operated by John Caley, of San Francisco, and D. Donovan, of Tucson. The purchasers, it is said, are large stockholders in the Greene Consolidated Copper Company, and will begin work at once.

CALIFORNIA.

CALAVERAS COUNTY.

Guiffra.—This mine, at Mokelumne Hill, has been bonded for $6,000, and work is to start in 90 days.

Lee Hunt.—This mine, near Milton, is bonded to San Francisco men. Machinery has arrived for its equipment.

Melones Mining Company.—At this company's property at Melones, Frank Langford superintendent, the new barrel chlorination plant has been started.

Morning Star.—Gen. Tolman is developing this mine, near Milton, and has purchased necessary machinery.

Nuner.—At this mine at Central Hill, worked under bond, some very good ore has been struck.

Payne-Laine.—This mine, formerly known as the Gumboot, near San Andreas, is under bond to San Francisco men who are putting up a mill and making other improvements.

Rose Rock.—A run in the new mill, at Murphys, has just been completed. The sulphurets are difficult to treat by ordinary methods.

Stockton Hill.—Some of the Chicago owners and officers of this mine, at Mokelumne Hill, have been visiting it with Col. Robinson, the superintendent. They are purchasing necessary machinery in San Francisco.

What Cheer.—At this property, near Mokelumne Hill, John Landers, owner, and J. H. Birch, superintendent, gravel has been struck in an upraise from a drift at a depth of about 300 ft.

KERN COUNTY.

Around Mohave and Coso Hot Springs there is some excitement over the finding of very rich ore in new ledges by some prospectors from Inyo County. The nearest water to the claims is about 12 miles.

Gold King.—This mine, at Rosamond, owned by W. Carter, has been sold for $7,000 to J. F. Walters, of San Francisco.

Randsburg Miners' Strike.—The strike among the miners at Randsburg has caused the shut down of the Yellow Aster, the biggest producing mine in the district. The company appealed to the sheriff, and a number of deputies have been appointed. The Baltic and several other mills have stopped. The strike has discouraged property owners so that efforts to rebuild the recently burned business part of the town have ceased for the present. About 300 men are on strike.

LAKE COUNTY.

Elgin.—This quicksilver mine, near the boundary of Colusa County, has been bought by S. H. Smith, H. R. Bradford and others, of San Jose. Thus far the ore has been roasted in retorts, but modern reduction works are planned.

LOS ANGELES COUNTY.

Red Rover.—The mill at this mine, at Acton, has been idle some years until recently. Messrs. Rudsch and Schilling, of Los Angeles, have a lease on the property, and are working it.

NEVADA COUNTY.

Murchie.—From this old mine, now being reopened by J. C. Campbell and others, ore is treated at the Texas Mill. Development work continues.

PLACER COUNTY.

Holmes Lime Company.—This San Francisco company is about to open the lime quarry, near Colfax, on Bear River. A tramway will be built.

RIVERSIDE COUNTY.

Pinon.—The company, which some time ago purchased this group of claims in Pinon District, reports a vein of good ore 4½ ft. wide, in a claim adjoining the old Pinon Mine, which was worked 10 or 12 years ago.

SAN BERNARDINO COUNTY.

Gold Peak.—Another small gold bar has come from the 5-stamp mill of this mine at Victor, Charles J. Holland, Los Angeles, manager. This property was bought last February by a Los Angeles company, which put up the mill.

Woodstock Mining Company.—At this company's mines, near Barstow, Walter Liming superintendent, some good ore at 180 ft. depth has been found. The company owns 22 mining claims.

SAN DIEGO COUNTY.

California Gold King.—Only about one-quarter of the full crew is at work. The suit brought against the company by the Colorado Iron Works is doubtless causing this, and the delay in the construction of the mill. It is reported that Senator Dorsey has disposed of his interest in the property.

Julian Consolidated Mining Company.—This recently organized company has bought 13 claims at Julian, and telluride ores are reported discovered. A. C. Lathrop is president and W. W. Boswell superintendent. The offices are at Los Angeles, where Lewis Butman is secretary and treasurer.

Mesquite District.—Some new placers of considerable extent are being worked in this district about 25 miles northwest of Yuma.

SHASTA COUNTY.

American.—At this mine, near French Gulch, a 2,900-ft. tramway is being built to connect the mine and mill.

Brown Bear.—This mine, near the Niagara, at French Gulch, owned by Mrs. Wheeler and Mrs. Porter, of French Gulch, is producing largely at present.

Washington.—This mine, near French Gulch, under lease to Charles Webb, has made a $10,000 clean-up.

Detroit & California Mining Company.—This company, T. R. Heintz president, which recently lost its large new gold dredge by fire, is negotiating with the manufacturers for new machinery to replace the entire plant.

Gladstone.—The lower tunnel in this mine, near French Gulch, is showing up well, and 100 men are employed. The mine is owned by the Hazel Gold Mining Company. J. O. Jillson is manager.

SISKIYOU COUNTY.

Blue Ledge.—At this big copper property, about 5 miles south of the Oregon boundary line, under bond to Patrick Clark and B. C. Kingsbury, of Spokane, Wash., the ore-body is reported about 20 ft. wide, carrying, besides copper, some gold and silver. Twenty men are employed. Sixteen claims have been stoped.

TRINITY COUNTY.

California Gold Surety Mining Company.—This company, at Trinity Center, Hugh Hume president and J. H. Boyce manager, intends erecting a crushing plant on the property. The first payment on purchase price has been made.

Fairview.—This mine, at Minersville, Jos. Porter superintendent, continues to yield a monthly gold brick worth from $3,000 to $6,000.

Layman.—This group of four claims, at Hayfork, owned by J. B. Layman & Sons, has been bonded by A. J. Van Matre for $50,000, and work must begin within 30 days. A new shaft will be sunk at once. The ledge in the lower 180-ft. tunnel is 30 ins. wide, and runs about $20 per ton.

Ralston.—The ledge has been struck in the lower level of this mine, at Dedrick. George L. Bailey is the owner. The mine has a triple discharge 2-stamp mill.

Rose.—This mine, on Coffee Creek, near Dorleska, owned by M. P. Rose, is being developed. The ore is similar to that of the Dorleska, which is about 2,000 ft. farther up the creek.

TUOLUMNE COUNTY.

Big Casino.—At this mine, at Groveland, a pump run by compressed air is to be put in.

Golden Key Mining Company.—This company, between Chinese Camp and Coulterville, has elected the following directors and officers: F. A. Wallin, president; R. Westwater, vice-president; A. W. McQueen, secretary; R. J. Smith, treasurer; Charles Nauman, L. M. Sherwood and R. M. Ryley.

COLORADO.

CLEAR CREEK COUNTY.

(*From Our Special Correspondent.*)

Miners' Strike.—The miners' union called a strike on the Sun and Moon property on February 1. Since then other mines have been affected. The union rejected every proposition looking to a compromise. As a result all of the mines have started with non-union men under the protection of the Citizens' Protective League, which has a membership of 500. The local union is now on its last legs, and from now on Idaho Springs will not be troubled by it, there being left but 30 men in good standing, several of whom were brought into the district from radical camps to bolster up a lost cause. President Moyer, of the Western Federation of Miners, has dropped negotiations. There is always a demand for good miners, but the Sun & Moon and other properties are working all the men needed.

George J. Bancroft, of Denver, has taken up a big reservoir site at Yankee Hill, and will store waters for the purpose of power and sell the surplus to the ditch companies surrounding Denver. The water is to be turned into Clear Creek during low water, and then taken out near Golden. He is also figuring on placing a power plant at Yankee to supply power to mines and mills.

Central Tunnel.—A contract has been let to S. A. Knowles, of Idaho Springs, assistant superintendent of the Newhouse tunnel for driving the Central tunnel from its present heading at 1,800 ft. another 5,000. The owners have installed a Worthington water tube boiler of 325 h.p., a Rand compound compressor, capable of supplying 30 Slugger drills, and a dynamo, all in a fire-proof brick power house. Water boxes are being put in, and the cross-cutting will be resumed within a few days. Mr. Knowles is to drive the tunnel 7 by 5 ft. for 5,000 ft., and furnish the powder and sharpening for $50,000. This will bring the tunnel to the Bald Eagle and Windsor Castle mines owned by the company. A drift will then be run east to the Belman on the Gem vein 1 mile west of the Newhouse tunnel.

Consolidated Gem Gold Mines Company.—Since the incorporation in New Jersey for $7,500,000, plans have been under way for heavy work, and over 200 men are now employed in development. The Gem vein is owned by the company for almost 2 miles, and besides drifting and raising from the Newhouse tunnel at a depth of 2,000 ft. on the vein, the company is working air drills through three different shafts. A new Vulcan hoist has been purchased and will be installed at the Gem shaft to connect with the raise, after which the ores can be either raised or lowered for the 2,000 ft. W. E. Renshaw is manager.

Idaho Springs Mining and Reduction Company.—Capt. Isgrig, of Idaho Springs, has put this mill in shape for handling 175 tons of ore per day, most of which will come from Gilpin County. The work was done by Fairbanks, Morse & Co. The annual meeting will be held on July 8. About $60,000 were spent in completing the plant.

Little Mattie Mining and Milling Company.—Manager W. S. Leebrick, of Idaho Springs, has opened some rich ore in the lower levels of the Mattie, and a wide streak of concentrating ore. Final payment has been made on adjoining property.

Newhouse Tunnel.—The recent sale of mining property by Samuel Newhouse did not include the Newhouse tunnel at Idaho Springs. Several companies are working lodes through it, but the cross-cut will not be extended until the mining companies agree upon the terms, assuring Mr. Newhouse some revenue. Negotiations are still under way between the Saratoga and the Martin holdings. If a contract is made with the latter a lateral will be extended through the Martin holdings to the Old Town group.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Evergreen.—This property in Pine Creek District is worked under lease and bond by Joseph Walter, of Apex. In the upper tunnel workings he has uncovered about 3 ft. of ore, showing considerable yellow copper, and assaying well. Shipments will be made in a few days.

Foote & Simmons Mining Company.—This company contemplates installing a 10 by 12 hoist and 80-h.p. boiler at its Foote & Simmons Mine on Bobtail Hill, and will sink from 800 ft. to 1,000 ft. A force of 20 men is at work on company and leasing account, and regular shipments of milling ores are made, averaging 2 oz. gold per cord on the amalgamating plates, the tailings bringing values of from $22 to $65 per ton at the sampling works. Colorado and Eastern men are interested. Sam Mellor, Black Hawk, is superintendent.

Golden Rod Mining and Milling Company.—Chicago men are interested in a group of claims in Silver Lake District, and are developing them through the Pet by a working shaft. They have taken out some ores carrying values of $38 to $158 per ton, and as high as 22 per cent copper. The company will install machinery for deeper work. New buildings are being erected. John Lillig, Black Hawk, is in charge.

Old Town Consolidated Mining Company.—This company is among the heaviest shippers of the county. The shaft is down 1,000 ft. A 6-drill Norwalk compressor was installed this week. About 60 men are at work on company and leasing account. During the past week Roberts and Thomas, lessees, received returns for a month's work, netting them over $40 per day. A shipment of a 100-ton lot of dump ore by the company netted an average of over $10 per ton. G. K. Kimball, Jr., Idaho Springs, is manager.

Steady Income Mining Company.—Denver men are back of a lease and bond proposition on the Phillips and Steady Income lodes in Russell District, have begun unwatering the property. The main shaft is down 200 ft. Frank Straub, Central City, is in charge.

Town Topics Gold Mining Company.—This company, operating the East Notaway, in Russell and Lake districts, has declared its ninth successive dividend of ½c. per share, equal to $5,000. The company has installed a larger hoist, and has one of the most complete top plants in the county. About 40 men are employed, mostly on the leasing system. The shaft is down 666 ft., and the company contemplates sinking to 1,000 ft. Marshall D. Draper, Central City, is superintendent.

Wautauga.—Idaho Springs men have a lease and bond on this property in Russell District, and are preparing to work it. The main workings, down over 600 ft., have been unwatered. The property was consolidated with the Old Town a few months ago.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Shipments continue at the rate of 2,700 tons a day of all classes of ores. The drop in lead from $3.75 to $3.50 is not looked upon as permanent.

Leadville Basin.—At one time there was a theory that the Leadville Basin (downtown section) was underlaid with ore. The finds with the diamond drill in the Midas, the Coronado and the opening this week of the same iron shoot in the Home Company territory, go to prove this theory. The discoveries are of the greatest importance.

Leadville Zinc Situation.—The zinc outlook is very bright. Shipments average 300 tons daily, of which 100 tons goes to the Empire Zinc Company at Canon City; 50 tons to Gas, Kan., and 150 tons to Belgium. The Empire Company is rebuilding its plant, and will soon be able to increase shipments.

Amity.—This St. Kevin property is paying small dividends to local lessees, who have opened up a good iron-silver body.

Banker Mining Company.—It is not known what will be done regarding this Breece Hill property.

Caribou.—Daily shipments are 100 tons of good grade iron and 30 tons of high-grade lead ore. Arrangements are being made to develop through another shaft at the etxreme end of the Caribou where the iron is 65 ft. thick, and a spur is to be built to the shaft by the Rio Grande.

Fanchon.—Operations are to resume on this Sugar Loaf property and the shaft is to be sunk 200 ft. more.

Gold King.—W. Z. Kinney has ordered machinery from a Denver firm for the new 200-ton mill at the Gold King, near Silverton.

Hayden-Lima Placer.—Manager Richards has been troubled with high water, but a drainage tunnel has been run and operations have resumed. A good clean-up is expected this season.

Leadville-Oro Mining and Leasing Company.—This newly formed company, under the management of J. R. Cummings, has secured a large acreage between the Carbonate fault and the P. O. S. and Bon Air mines, including the Oro and O'Donovan Rossa claims. The new company under the management of John R. Curly intends sinking a shaft from surface 600 ft., and drifting northwest to cut the shoots of the P. O. S. and Bon Air. A large plant of machinery has been ordered and work begins in July. W. G. Nicholson, of Denver, is president ,and C. G. Turner, of Beaumont, Texas, treasurer.

New Leadville Home Mining Company.—In a drill hole at the 631-ft. level, 300 ft. north of the Penrose shaft, 28 ft. of iron running from 9 to 16 oz. silver a ton was cut. The drill then struck quartzsite, but at 75 ft. entered iron ore of the same character as that of the Midas, and has cut 30 ft., and is still in ore. From the upper workings 130 tons daily of good ore are shipped.

New Monarch Mining Company.—Manager Timothy Goodwin begins at once the most important work ever planned on the gold belt. The Monarch shaft will be retimbered from top to bottom, a plant of five 200-h.p. boilers put in and the shaft sunk to a depth of 2,000 ft. The Lida and Winnie shafts are showing large ore deposits, and shipments will be resumed at once from the upper workings at 30 0tons daily.

Pilot Mining Company.—The final adjustment of litigation this week confirming the ownership of the company and the Carleton Brothers in the Jason, Neptune and Whale properties, means a probable resumption of operations in the Poverty Flat section of the Leadville Basin after a long idleness. The Pilot Company is financed in Boston and plans are under way for re-organization.

Western Mining Company.—This combination, conducted by Messrs. S. D. Nicholson and Julius Rodman ,is shipping 600 tons daily, and doing much prospecting and development. The connecting drifts (800 ft), between the Midas and Coronado, will be through in 150 ft .more. The water in the Coronado has been lowered, the company pumping 600 gal. a minute, and shipments will be steady at 150 tons of iron ore daily. From the Midas 100 tons of good iron is shipped daily, while 150 tons of crude ore and 100 tons of zinc and concentrates come from the Wolftone workings. At the A. Y. & Minnie property 150 tons daily of zinc and concentrates are shipped. The Wolftone pumps handle all the water, pumping 1,000 gal. a minute.

Yak Mining, Milling and Tunnel Company.—Shipments are 150 tons a day. Connections with the Ibex shaft will be completed early in July.

LAS ANIMAS COUNTY.

Carbon Fuel Company.—This recent incorporation, said to be backed by the American Smelting and Refining Company, will begin working coal lands near Aguliar soon. The company is said to own coal lands in Colorado, Wyoming and New Mexico.

SAGUACHE COUNTY.

(*From Our Special Correspondent.*)

Goldmont Mining and Milling Company.—This company, with headquarters in Denver, owns a large group of mining claims on the Western slope of the Sangre de Cristo Range, 3 miles from Alder, on the Denver & Rio Grande Railway. The property is being opened by tunnel to cut a very wide gold-bearing dike, at a depth of 800 ft. The company is erecting a 150-ton mill, to concentrate the ore at the rate of 9 to 1. The concentrates will be shipped by rail to the smelter of the Ohio & Colorado Smelting and Refining Company, at Salida, 20 miles distant.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

Baker Bridge Electric Company.—This concern has been organized to supply electric power for San Juan County mines and mills. The plant is to be located on Animas River, near Durango. The company is capitalized at $3,000,000, with the following directors: Mark Watser, W. L. Hereth, B. Frank Schmid and Fred C. Schmid, of Indianapolis, Ind.; S. B. Morris, of Shelbyville, Ind.; J. W. Adams, of Chattanooga, Tenn.; P. J. Brown and P. H. Scott, of Denver. Work on the dam has started.

Irene.—This old producer has been leased by its owners, Carad & Watson, to Andrew Larsen et al., and work has started.

Isolde.—This group, at Burrows Park, recently began shipping via Silverton. The output averages 10 tons per day of $30 gold ore.

New York-Brooklyn.—Manion Brothers & Murphy are making a shipment of 100 tons to the Burro Bridge Mill for a trial run, preliminary to building a mill.

Silver Ledge.—Funds have been secured for a three months' trial run of the mine and mill, and the net receipts will be used to pay claims against the defunct Bank of Silverton, which owned the property.

Stony Pass Mining Company.—A majority of the owners of this company's properties were in Silverton recently, and planned tunneling and development of the Stony Pass group. Air drills are to be installed immediately.

Stoiber Tunnel.—Work has been resumed on this tunnel, near Silverton. The tunnel is in 1,500 ft., and air drills will shortly be used.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Acacia Gold Mining Company.—Considerable work is being done under lease on the north end and in the old workings of the Burns claim, and some ore is being shipped. On the south end of the Burns, Newhall and associates are drifting for the ore shoot on the second level. On the Morning Star Sharpe and Wyatt are getting some very good ore.

Elkton Consolidated Gold Mining Company.—Good reports continue to come from this property, especially as regards some of the leases. The company is not working a very large force, and no work is done on the lower levels on account of the water.

Free Coinage.—Conditions have improved of late. The property is worked under a number of leases, several of which are producing ore. The main workings worked by Shell and associates have recently shown some good ore, and a fair sized force is busy. The property is on Bull Hill, near the town of Altman. A large part of the stock is held by the estate of the late Sam Strong.

Globe Reduction and Mining Company.—The first clean-up of the mill, near Goldfield, was made this week, and one of the officers of the company said he was well satisfied with the result. The Ironclad ore is low grade, but is well suited to a cheap cyanide treatment.

Golden Cycle Mining Company.—The suit between the minority and majority stockholders resulted in a victory for the latter. After the plaintiffs had put in their evidence, the attorneys for the defendants moved to have the suit dismissed. It was after considerable argument. The defeated parties may take the case to the United States Supreme Court if necessary. Immediately after the decision of the court a directors' meeting was held, which proved to be quite stormy. A dividend of 3c. per share was declared. The meeting of the stockholders was called for July 10, when a number of important questions are to be brought up, among them the removal of the offices from Denver to St. Louis.

Hull City Placer.—It is reported that the pumps on the lower levels have been pulled, as the water coming in is more than the pumps can handle. The property is worked under lease by the Cripple Creek Mining Company, and is shipping a large quantity of ore. The property adjoins the Vindicator.

Isabella Gold Mining Company.—Although it has been repeatedly rumored that this property has been leased to a syndicate nothing of a reliable nature can be learned. The company is doing nothing, though a few lessees are at work.

Stratton's Cripple Creek Mining and Development Company.—Eight blocks have been leased to a syndicate, headed by Milton Smith and Col. Hollister, of Denver. The blocks include the Abe Lincoln in Poverty Gulch, which is being worked by the company. A number of the blocks on Gold and Globe hills will be leased at once. The policy of the company is to let leases to the applicants who are found to have the best financial standing.

IDAHO.

BLAINE COUNTY.

Baltimore & Victoria Mining Company.—This company, composed chiefly of Salt Lake City people, is to develop James McGregors Wood River properties, in the Warm Springs Creek District. The capital stock is $1,500,000 in $10 shares. The directors and officers are: Thomas Marshall, president; Samuel D. Conner, vice-president; T. R. Jones, treasurer; Jas. McGregor, secretary, all of Salt Lake City, Utah; and Edward L. Preston, Hailey, Idaho.

SHOSHONE COUNTY.

Simmons.—This group of nine claims, in Bear Gulch, about 8 miles from Murray, is reported bonded to Toledo, O., people. The owners are A. T. Simmons, M. S. Simmons and David Avery.

Tiger-Poorman.—The head works of this mine, at Burke, which were almost destroyed by fire a few weeks ago, have been repaired, and shipping will be resumed. The mine has been opened to a depth of 1,970 ft., including a 70-ft. sump. W. Clayton Miller is manager.

Wild Rose.—This mine, near Pierce, is said to have produced in the past 18 months about $27,000. Two bricks from a recent clean-up were valued at $9,000. There is a small stamp mill on the property. A contract has been let to run a 350-ft. cross-cut from the 107-ft. level. Mr. Dunn, M. A. Ellis, of Pierce, and W. S. Wilkinson, of Kaslo, are the owners.

ILLINOIS.

MACOUPIN COUNTY.

(*From Our Special Correspondent.*)

Royal Coal Company.—This company, recently organized, is sinking a coal shaft at Virden, on the Chicago & Alton Railway. John B. Falcetti recently superintendent of the Virden Coal Company, is superintendent of the new company.

SANGAMON COUNTY.

(*From Our Special Correspondent.*)

Cora Coal Company.—This company has just been incorporated in Springfield to open a mine on the Chicago, Peoria & St. Louis Railway at Cora, just north of the Sangamon River, and about 5 miles north of Springfield. James Duncan, of the Duncan Brothers Foundry and Machine Company, of Alton, Ill., is managing the preliminary arrangements. Other officials of the Chicago, Peoria & St. Louis Railway are interested. Both the hoisting shaft and the air shaft will be 8 ft. by 16 ft. in the clear. The gauge of the mine tracks will be 42 ins., and the hoisting shaft will be equipped with the Duncan patent self-dumping cages, and a shaker screen. The air shaft will be equipped with a 7-ft. by 20-ft. fan. It is probable that a steel tipple and tower will be built.

Peabody Coal Company.—This Chicago company, Francis B. Peabody president, is sinking a large mine on the Chicago & Alton Railway, northeast of Springfield, and just north of the Sangamon River.

Springfield & Chicago Coal Company.—This company has started work on its mine on the Chicago & Alton Railway, northeast of Springfield.

Sullivan Machinery Company.—This company is drilling for coal for the Junction Mining Company, of Chicago, south of Springfield, and near the property sold about a year ago by the Junction Mining Company to the Riverton Coal Company, and consolidated in the Springfield Coal Mining Company. Charles Price, of Chicago, is general manager of the Junction Mining Company.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Arcadian.—Mining is completely suspended, and the Douglass shaft closed. Diamond drill explorations continue.

Atlantic.—A rich streak of copper ground has been opened in A shaft.

Centennial.—The tracks of the Copper Range Railroad will be extended a few hundred feet from the main line to A shaft.

Copper Range Railroad.—This company has awarded a contract to C. J. Johnson for the construction of a branch to the new smelter on the old Atlantic mill site. Tracks will also be laid at the top of the bluff, at the delivery side of the smelter for handling the finished product, and at the feeding side for the delivery of coal, mineral, fluxes, etc.

Franklin.—Drifting south at the eighth level has been started at the shaft at the Junior branch. The seventh-level drift south is in 1,250 ft.

Michigan Smelting Company.—This company has filed articles of incorporation. Its object is to smelt, refine and manufacture copper and other metals. The capital is $500,000, divided into 20,000 shares of a par value of $25 each, $50,000 paid in. The incorporators are Dr. Lucius L. Hubbard, R. T. McKeever, Fred W. Denton, John H. Rice and Allan F. Rees, trustee, who constitute the board of directors. The plans for the smelter are completed and construction work will start at once. The site is 2½ miles west of Houghton, near the mouth of Cole's Creek, on Portage Lake. The plant will contain 5 reverberatory furnaces, 3 of which will be melting and 2 casting, and a cupola. The method of treating the mineral will be essentially the same as that used at the other Lake Superior smelters. The main office of the company will be at Boston, Mass., and local office in Houghton, Mich.

Trimountain.—It is expected that the 4th head will go into commission about the middle of July, when rock shipments to the Arcadian mill will be stopped.

Wolverine.—Cross-cutting west from No. 3 shaft at the 13th level is under way. The work will be continued 1,200 ft. to the Kearsarge conglomerate lode. The mine is shipping 1,025 tons of rock daily, entirely from Nos. 3 and 4 shafts. Twenty-five power drills are in operation.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Ahmeek.—The Kearsarge amygdaloid lode is reported 20 ft. wide where penetrated by the cross-cut, and the entire formation well mineralized.

Allouez.—Part of the force at the shaft on the Allouez conglomerate has been transferred to the new shaft being sunk to cut the Kearsarge amygdaloid.

Phoenix Consolidated.—The stamp mill is nearly ready, and will go into commission in a short time. It is equipped with a Ball stamp, 12 Hodge double eccentric jigs, 12 Cleaves rocker jigs, 8 Overstrom diagonal concentrating tables, and 4 Wilfley tables. It has a capacity of 300 tons of rock every 24 hours, but will be operated during the day shift only at first.

COPPER—ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

Adventure Consolidated.—The mill is treating 700 tons of selected rock per day, the 3 stamps dropping during the day shift only. Sinking in Nos. 1 and 3 shafts is pushed rapidly. No. 1 is 750 ft. deep and No. 3 565 ft. The rock is said to average slightly less than 1 per cent copper. Thirty-five machine drills are in commission, and about 400 men are employed. Capt. Thomas Dennis is superintendent.

Mass Consolidated.—Sinking in A and B shafts is under way below the 12th level. Excellent copper-bearing ground is opening west of B shaft. C shaft is now down about 450 ft. on the Butler lode. Drifting east and west at the third level is under way. The mine continues to produce a large amount of mass and barrel copper.

Michigan.—This company recently shipped 35 tons of barrel and mass copper to the smelters on Portage Lake. Another shipment will be made shortly.

MINNESOTA.

(*From Our Special Correspondent.*)

Several companies have been organized to mine coal in the northern part of Aitkin County, and have started work. The only thing approaching coal known before in Minnesota is lignite, and the seams are thin and impure.

Ore carrying records have been broken by the steamship *William Edenborn*, which carried out of Duluth 7,729 gross tons of iron ore. The *Edenborn*, *J. J. Hill* and *I. L. Elwood*, all of the same size, and owned by the United States Steel Corporation, took out the same day last week 22,790 gross tons, the largest tonnage ever carried on three lake vessels. They were loaded to 18 ft. 5 ins. forward and 18 ft. 10 ins. aft, which would probably even up to about 18.7 at the Sault. Water is slightly deeper on the lakes than last year at this time, and vessels are trying to make the heaviest loads possible. The new rapid unloading ships were somewhat in the nature of an experiment, but as they have now proved extremely successful it is probable that some of the United States Steel Corporation vessels will be similarly fitted another season. These ships unload about 1,200 tons an hour, and in some all the cargo is taken out without hand labor.

Eleven subsidiary companies to the Minnesota Iron Company that have been located in Chicago, will hereafter have offices at Duluth.

During one day last week 876 cars of ore were unloaded at the Duluth & Iron Range docks in 10 hours.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Contracts have been let by the Duluth, Missabe & Northern road for the construction of spurs to the

Clark and Chisholm mines, that were the property of the American Mining Company, and shipped over the Great Northern road, as the American is a part of the United States Steel, the ore is now to be carried over a road belonging to the Corporation. Under the Great Northern's contract no change can be made prior to January 1 next.

Crescent Mining Company.—The lease on this company's property in section 24, T. 58, R. 20, has been sold to the Minnesota Iron Company for $125,000 bonus on the 25c. leasehold.

MISSOURI.

ST. FRANCOIS COUNTY.

(From Our Special Correspondent.)

The recent high water in the Mississippi shut off all railroad communication through the St. Louis gateway. This has stopped lead shipments for the present, and seriously interfered with the delivery of coal to the mines. It is expected that freight traffic will be resumed June 22.

Mine la Motte.—The recent finding of nickel and cobalt in large quantities has stimulated prospecting in this vicinity, and has caused Michigan men to drill adjacent lands.

MONTANA.

BEAVERHEAD COUNTY.

(From Our Special Correspondent.)

Bonanza.—W. E. Sanders has surrendered his bond on this property on Steele Creek, 80 miles from Divide Station, as the development did not justify building a mill.

Indian Queen.—The Western Mining Company, which is operating this Birch Creek property, has in operation a 50-ton water-jacketed furnace. The first run of matte, from ore averaging 10 per cent copper, assayed 60 per cent copper, 18 oz. silver and $4 gold. The ore is a carbonate and is opened to about 300 ft. depth. Below water the ore changes to glance. Plenty of lime and iron for fluxing purposes is available. Coke is hauled from the railroad, a distance of 6 miles.

CARBON COUNTY.

Montana Coal and Iron Company.—It is reported that negotiations are pending for the purchase by W. A. Clark of 3,000 acres of coal land at Bear Creek, owned by this company.

GRANITE COUNTY.

Montana Mining Company, Limited.—The Barton & Jones group of mines, at the head of Warm Springs Creek, is reported bonded by this company for $40,000.

JEFFERSON COUNTY.

Henry McCabe, representing Denver men, has located 30 claims in the Corbin-Wickes District, 20 miles south of Helena.

Chicago & Alta Extension Mining Company.—This company intends developing property a mile west of Corbin, near the old Alta Mine. G. B. English and John W. James, of Anaconda, with some Chicago people, are interested.

Scattle & Boston Mining Company.—This company, said to be behind the Montana Reduction Company and the Basin & Elliston Railroad Company, has secured right of way for its road through Basin.

MADISON COUNTY.

Elkhorn-Iola.—Work has been resumed on this property by A. C. Sandes, of Minneapolis, Minn., who recently took a lease and bond. A 12-h.p. gasoline hoist is being installed.

PARK COUNTY.

Kimberly-Montana.—This company expects to have its new 80-stamp mill and cyanide plant at Jardine completed early in July. Alexander Livingston has charge. During his receivership the mines produced about $83,000 in gold. The property has large ore reserves blocked out.

SILVERBOW COUNTY.

Montana Ore Purchasing Company.—This company is preparing to resume work on its Belmont Mine, in Butte. The mine has a 450-ft. shaft, but has been idle for several years. It is intended to sink the shaft 550 ft. deeper.

Pittsburg & Montana Copper Mining Company.—The excavations for this company's smelter, at Butte, are completed, and the foundations are being laid. It is announced that 12 Garretson furnaces will be installed.

Snohomish and Tramway.—These mines have been closed down for the past seven months, owing to litigation between F. A. Heinze and the Boston & Montana Company. John S. Harris is receiver, and reported May 31, $210,437 in the banks to his credit, and $814 disbursements for the month.

(From Our Special Correspondent.)

Belle.—King and Johnson will mine on the north vein of this property under a lease from the Anaconda Copper Company.

Belmont.—The United Copper Company is placing machinery on, and intends operating, this property.

Grant.—James McGovern & Co. have a lease on this property from the Anaconda Copper Company. It is situated just below the Anaconda Mine. It is said that the lessees have a body of copper glance 4 ft. wide to work on.

Wild Bill.—M. L. Holland, W. J. Naughton and associates have secured a lease on this property, which belongs to the Anaconda Copper Company.

NEVADA.

HUMBOLDT COUNTY.

Sheba.—The mill for this mine, near Mill City, started recently. G. W. Bartch, president, and W. H. Child, secretary, were present from Salt Lake City, Utah.

LINCOLN COUNTY.

Newport & Nevada Gold Mining Company.—A contract for a 30-ton Chilean mill has been given the Trent Engineering and Machine Company, of Salt Lake City, Utah. The mill will be on the company's Homestake Mine.

NYE COUNTY.

(From Our Special Correspondent.)

At Tonopah there is trouble between the miners' union and the mine owners. Contractors working in the mines and paying the miners $4 per day have been making from $7 to $10 per day on their contracts, and the miners are trying to have the contract system abolished. After much discussion they demanded that the companies pay each contractor $5 per day the latter to pay all his men $5 per day.

It is understood that the mine owners will reject the demand, in which case it is probable that many mines will close down indefinitely. Incidentally it is supposed that some of the men owning the producing mines will not be averse to a shut-down, as the prices of the stocks will depreciate and can be bought in.

OHIO.

BELMONT COUNTY.

Work on the new coal mine on the Keyser farm, 2 miles east of Flushing, has begun. The main building will be over 100 ft. long. The tipple will be steel, with self-dumping cages. About three months will be required to complete the shaft. R. Shields is superintendent.

PENNSYLVANIA.

ANTHRACITE COAL.

Audenreid Coal Company.—This company will rebuild its washery at Audenreid that was burned recently.

Lehigh Coal and Navigation Company.—By an explosion of gas in No. 4 mine at Tamaqua, last week, 14 men were badly burned. The explosion is supposed to have been due to a defective safety lamp.

BITUMINOUS COAL.

Clairton Steel Company.—This company, of Pittsburg, has acquired 32 tracts, aggregating nearly 3,000 acres of coal land in Luzerne township, for $1,322,057. A large coke plant will be erected.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Chicago Mica Company.—The Crown mica mine, northwest of Custer, is being worked and the product shipped to the company's manufacturing plant at Valparaiso, Ind. F. W. Tolles, of Milwaukee, a stockholder, is visiting the property.

Interstate Mining Company.—The shaft has cut the vein at 40 ft. W. R. Millham, superintendent, is planning to increase the working force.

London & Dakota Company.—London men are coming to inspect this group, near Custer.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Clover Leaf Gold Mining Company.—From 10 to 20 of the 60 stamps of the mill are dropping on ore from development work. Drifting is in progress on the two lower levels. The upper levels are to be sampled. O. B. Amsden is superintendent.

Lexington Hill Gold Mining Company.—Work has started on the property recently purchased in Spruce Gulch. A 300-ton cyanide mill is proposed, and an electric power plant in Deadwood, a mile from the mill site, will furnish the power. The 20-stamp mill will start in the meantime.

TENNESSEE.

WHITE COUNTY.

Bon Air Coal and Iron Company.—This company has completed a new shaft at Ravenscroft, with a daily capacity of 1,500 tons. It is also opening a drift mine and erecting 200 coke ovens at Eastland, 15 miles from Bon Air, and 7 miles from Ravenscroft.

UTAH.

(From Our Special Correspondent.)

State Mine Inspector Gomer Thomas estimates that 3,500 men are employed in Utah coal mines, and that the daily output is more than 6,500 tons.

Ore and Bullion Settlements.—Settlements made by Salt Lake banks for the week ending June 19 were $305,330, as follows: Gold, silver, lead and copper ores, $137,200; base bullion, $157,730; gold bullion, $10,400.

BEAVER COUNTY.

(From Our Special Correspondent.)

Kitty Clough.—This new mine is producing some sensational values; ore on the drift from the 100-ft. level assaying 25.5 per cent copper, $16 gold and 34 per cent iron, with small values in silver. E. S. Sawyer, of Milford, is one of the principal owners.

Newhouse Mines.—It is expected that Samuel Newhous, on his arrival, will approve plans and order work to begin on the proposed concentrator and smelter for the Cactus Mine.

Rollins.—This, the first metal mine discovered in Utah, will be sold at sheriff's sale on July 6 to satisfy a judgment of over $50,000. After the titles are cleared it is probable the property will be re-opened.

IRON COUNTY.

(From Our Special Correspondent.)

Ophir.—Attorney Barrette, of Salt Lake, bid this Stateline property in at sheriff's sale for the Detroit Trust Company, the holder of the mortgage foreclosed, for the sum of $106,578, covering the company's claim. The mill cost about $100,000.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—For the week ending June 19,shipments were 123 cars, as follows: Centennial-Eureka, 31; Black Jack, 3; Ajax, 1; Bullion-Beck, 7; Carisa, 1; Dragon Iron, 25; Eureka-Hill, 10; Gemini, 13; Grand Central, 9; Lower Mammoth, 2; Mammoth, 1; May Day, 1; Martha Washington, 2; Star Consolidated, 4; Victor Consolidated, 3; Yankee Consolidated, 10.

Centennial-Eureka.—The shaft is completed to 1,700 ft.

May Day Mill.—The first car of concentrates from the new jigging plant is ready for market.

PIUTE COUNTY.

(From Our Special Correspondent.)

Annie Laurie.—The tunnels between the Annie Laurie and Blue Bird are connected.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Consolidated Smelter.—The shipments of copper bullion for the week ending June 20 amounted to 4 cars, approximately 245,000 lbs.

Butler-Liberal Consolidated.—This company is organized to absorb the Ben Butler and Chicago-Bingham. The capital stock is 500,000 shares of $1 each; Ben Butler shareholders receiving 375,000 shares, the Chicago-Bingham the balance. The officers are: A. L. Jacobs, president and general manger; C. H. Peterson, vice-president; E. D. R. Thompson, secretary, and McCormick & Co., treasurer. Active development will start at once.

Columbia Copper Company.—Manager Frank B. Cook states that plans are completed for the 60-ton mill, and that orders will be placed for the equipment very soon.

Great Western.—G. S. Hayes, of Salt Lake, has been awarded the contract to run a 1,500-ft. tunnel on this property, near Alta. An Ingersoll-Sergeant compressor and drills are being installed.

Tintic Company.—This company has been organized under the laws of Maine, with a capital of $3,000,000 in $5 shares. The concern is to serve as the parent company for the Tintic Mining and Development Company, Yampa Smelting Company and West Mountain Tramway Company, all of which are associated with the Yampa Mine, of Bingham, for which a smelter is under construction.

United States Smelter.—Shipments of copper bullion for the week ending June 20 were 3 cars, 181,369 lbs.

Utah Consolidated Smelter.—Shipments of copper bullion for the week ending June 20 amounted to 5 cars, 300,000 lbs.

Utah Copper Company.—This company is now in possession of the De La Mar-Wall group at Bingham, the first payment of $50,000 having been made. The company has also acquired a lease of the West Mountain Placer Company's property in lower Bingham, with privilege of purchase for $75,000. The new 500-ton concentrator will be erected on this ground, which carries with it some valuable water rights. The plant will be erected as soon as the plans can be drawn, and contracts let. D. C. Jackling is manager. The company will open offices in Salt Lake at once.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending June 20 shipments were 3,649,000 lbs. ,as follows: Comstock, 33,000; Daly-West, 1,974,000; Silver King, 1,642,000.

Comstock.—For lack of a quorum the stockholders' annual meeting was not held on June 13. The new mill is running with one shift.

Daly-Judge Mill.—This plant started again on June 16, equipped with the Sherman slimes settling tanks.

New York Bonanza.—The shaft is completed to 365 ft.

Wabash.—Drifting and upraising is in progress on the 600-ft. level. Over 5,000 ft. of underground workings have been run, costing approximately $100,000. Two veins have been disclosed, but as yet a limited amount of pay ore. Thirty men are on the pay rolls.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Consolidated Mercur.—Stockholders will meet in annual session at Jersey City, N. J., on July 6, to elect officers.

Eureka-Ophir.—This property is shipping 2 cars of ore weekly to the Salt Lake smelters. John W. Cairnes, of Gisborn, is manager.

Honerine.—Manager Willard F. Snyder, of the Western Exploration Company, has returned from a consultation with Eastern stockholders, with instructions to start work on a 100-ton concentrator for the mine at Stockton. The initial plant will be 100 tons capacity.

WASHINGTON.

FERRY COUNTY.

Lone Pine-Surprise Mining Company.—About 36 men are stoping ore at this company's mine at Republic; about 100 tons a week are sent to the Crofton Smelter on Vancouveer Island, B. C. There is said to be an indebtedness of about $50,000.

(*From Our Special Correspondent.*)

Belcher.—The management reports that the vein has been cut and found to be about 80 ft. wide, and that the first 12 ft. will average about $16 per ton, chiefly in gold, with some copper. The mine has recently been examined by Samuel Aughey, who reported very favorably on it.

Lucile Dreyfus Mining Company.—Dissatisfied shareholders are asking for the appointment of a receiver. The miners filed liens for over $2,200, which have been satisfied. The management is engaging teams to haul ore from the mine to the railroad.

Mineral Hill Consolidated Mining Company.—This company owns 13 promising lode claims, and others making 450 acres of mineral land; also the Morrissey placers of 182 acres, bordering on Kettle River. An air compressor, power drills, steam boiler and hoist are to be ordered. A two-compartment shaft, down about 100 ft., will be sunk 200 ft. deeper.

Violet.—The vein has been struck in the tunnel, 320 ft. from the portal. The ore runs $30 in gold, silver and copper.

Zala Consolidated Mining Company.—This company has arranged to ship 10 tons of ore per day.

OKANOGAN COUNTY.

(*From Our Special Correspondent.*)

Nighthawk.—The manager reports that the vein has been struck in the lower tunnel at 1,040 ft. in. The vein is reported rich in gold, silver and copper. Peter J. Somers, one of the directors from Milwaukee, Wis, has gone to the mine.

STEVENS COUNTY.

Walter Scott.—This mine, near Northport, is to have more machinery, and a contract has been let for 300 ft. of tunneling. The property is owned by Spokane and Eastern people. At the recent annual meeting the following directors were elected: Geo. E. Needy, president; A. M. Thomas, vice-president; Adolph Galland ,treasurer; R. A. Hutchinson, secretary; and E. W. Talbot, all of Spokane, with Stuart M. Walker, of West Virginia, and J. W. Meyers, of Maryland.

WEST VIRGINIA.

MERCUR COUNTY.

United Gas and Coke Company.—The new coke works will soon be put in operation. The daily output will be about 1,200 tons coke, to be used in the blast furnaces of the Carnegie Company, at South Sharon. Employment will be given to about 600 men.

WYOMING.

CARBON COUNTY.

North American Copper Company.—The large smelter is nearly completed, and will start soon. The plant is very complete, consisting of sampler, roaster, smelter, concentrator, converters, light and power plant, with a 5-ft. pipe line 6 miles long.

FOREIGN MINING NEWS

AFRICA.

RHODESIA.

The Chamber of Mines reports the production of the mines in May at 22,137 oz. gold bullion. For the five months ending May 31 the total was 95,825 oz., against 83,307 oz. in the corresponding period last year; an increase of 12,518 oz., or 15 per cent. The output this year was equal to 85,284 oz. fine gold, or $1,762,820.

TRANSVAAL.

The production of the Transvaal mines in May is reported by the Chamber of Commerce at 234,125 oz. fine gold, which is 6,254 oz. more than in April. For the five months ending May 31, the total is 1,075,253 oz. fine gold, against 514,062 oz. for the corresponding period in 1902; showing an increase of 561,191 oz. this year.

CANADA.

Rossland Shipments.—The ore shipments for the week ending June 13 were: Le Roi, 4,000 tons; Center Star, 1,680; War Eagle, 1,320; Kootenay, 290; Le Roi No. 2, 350; Velvet, 100; Giant, 30; total for the week, 7,700 tons; for the year to date, 171,527 tons.

White Bear.—The shaft is to be sunk to the 950-ft. level.

MINING STOCKS.

(Full quotations are given on pages 990 and 991.)

June 24.

In some quarters the stock market shows signs of convalescing, notably in those specialties that are usually supported by insiders when the low-water prices have permitted them to mature their plans for reviving speculation. Evidence that such is the case may be found in the reports that insiders are again buying Amalgamated, the leader in the recent bear raid. The calendar of sales does not betray the motives of the manipulators, nor do prices, but judging from the tactics heretofore practiced, the public will not learn how the tide is turning until the professional element sees fit to solicit their confidence by circulating bull rumors.

Amalgamated Copper sold at $53@$54.25, while Anaconda at times has been invisible, and on Tuesday changed hands at $21, or $4 below par. United Copper, on curb, made small sales at $18⅛@$18½, and Tennessee at $28½. Greene Consolidated, of Mexico, shows the largest transactions, selling at $19½@$20¾. White Knob, of Idaho, is weaker around $12.

The gold and silver stocks are in an apathetic condition. Perhaps the best explanation may be found in the extravagant promises made by promoters of new mines who advertise in the newspapers. Unfortunately many of these "dividend paying" mines peter out when the sales of stock cease, leaving the stockholder certificates of no market value.

The business done on the exchange this week shows sales of Horn Silver, of Utah, at $1.15; Portland, of Cripple Creek, Colo., at $1.30; Consolidated California & Virginia, of Nevada, at $1.55@$1.65; Ophir, at $1.85; and Standard Consolidated, of California, at $3.

Boston. June 23.

(*From Our Special Correspondent.*)

The reduction in the price of copper was not unexpected, and exerted very little influence on the price of copper shares. The speculative temper is not bullish, as a further reduction is looked for in some quarters. However, this should have little effect on the stock market, as the advance was not reflected in the shares at all; on the contrary, prices yielded. The better grade of copper stocks find purchasers, although Calumet & Hecla has lost $20 to $450. A feature in the market was the sharp advance in United States Mining to $23 on Friday. From this it sagged to $21.37½, recovering a fraction. Managing Director Holden, who has been in this city, speaks very hopefully. With five furnaces operating he believes that 25,000 tons of ore per month will ultimately be handled. A special meeting has been called for July 6 to amend the by-laws. An executive committee will hereafter manage the property.

Dominion Coal has advanced $4.50 to $93.50. The regular $2 quarterly dividend has been declared on the common stock, but it is expected that hereafter the rate will be 6 per cent per annum. Dominion Iron and Steel has also advanced $3.37½ to $16.62½. The strength of both these securities is due to the fact that directors of the latter company have authorized the issue of $1,500,000 second mortgage 5 per cent bonds at par to meet construction needs. Insiders are reported to have taken the issue.

Copper Range Consolidated declined $1.37 to $52 during the week, but rallied to $54.37½, and closed at $53.50. Trimountain fell $3.50 to $86.50, rallying $1. The stock is said to have been corralled by insiders, so that not more than 5,000 shares are floating. Osceola recorded a $3 advance to $57, but lost it.

Utah Consolidated settled $1.62½ to $28 on unfounded rumors that an accident had occurred at the property. This, however, was denied from an official source. United Copper sold down to $15.75. Allouez holds firm at and above $6. Good reports come from the new shaft to tap the Kearsarge lode. Atlantic is quiet, closing around $10. Isle Royale fluctuates between $7.50 and $8. Wolverine has lost $2 to $65. Mass Mining sold at $7.50@$6.50. Rather unfavorable reports come from the property. Shannon has varied from $12 to $11.25. The mine is again in full operation after the recent strike.

Colorado Springs. June 20.

(*From Our Special Correspondent.*)

A market that wavered between good days and bad days has prevailed during the past week. There have been several surprises, notably the mysterious break in Portland, the decision in the celebrated Golden Cycle case and the announcement that the Isabella Company will lease its property early next week to two of the strongest mining concerns in the district. Portland was quoted a week ago at $1.28 bid, with $1.35 asked. The first trading, however, was done at $1.28@$1.28¼ on Wednesday, after which the stock weakened perceptibly and was next heard from Friday, when it was selling at $1.27. Today it broke again and sold at $1.25@$1.23, closing sensitive at $1.23 bid, with $1.26 asked. C. K. & N. strengthened materially during the week, and sold at 21c., with 21c. bid, and 21¼c. asked. El Paso was weak and generally listless, selling down from 61c. a week ago to 60½c. and 60c. Golden Cycle sold last Saturday at 71½c. down to 69½c. yesterday, and back to 70c. The directors declared a 3c. dividend, amounting to $45,000, this week, payable June 25. Isabella sold at 15c. all during the week, except one day, when it swung up to 15⅝c., but lost to 15c. later. In the prospect department, Mary Nevin was active and quite sensitive, owing to reports, which are probably true, that Mr. Granfield has secured a three years' lease on the Nevin ground. The Beacon Hill stocks are all quite active, and in general favor for speculation.

Salt Lake City. June 20.

(*From Our Special Correspondent.*)

Summer weather is beginning to have its effect upon the market. During this week the total business transacted on the Stock Exchange was the transfer of 177,695 shares for $107,513. About the only stocks which escaped being marked lower were Consolidated Mercur and Daly-Judge. The former advanced from $1.29 to $1.42. The work of equipping the mill with the Moore slimes process is progressing, and the management expects that everything will be in readiness to start up about July 1. The Daly-Judge plant has been started again, equipped with the Sherman slimes settling tanks, and officers of the company say, are giving good satisfaction. California, of Park City, closes stronger. The principal trading done was in Tintic stocks, but all are quoted lower. Lower Mammoth, as usual, fluctuated considerably, going as high as $1.06 during the week; 27,900 shares selling. May Day was offered freely, 13,900 shares going. A better tone to the stock is anticipated next week. Star Consolidated sold to the extent of 16,350 shares; Uncle Sam Consolidated, 2,100 shares. A small lot of Silver King was offered at $70.50 and taken. Yankee Consolidated held its own very well, considering conditions. The Grand Central disbursed its June dividend of $25,000, or 10c. a share to-day.

San Francisco. June 20.

(*From Our Special Correspondent.*)

Business on the old exchange was somewhat better this week. Quite a demand developed for the North End and Gold Hill Comstocks, and some of them showed a small gain in prices. The old hands claim to have noticed an increase of outside interest.

Consolidated California & Virginia sold up to $1.60; Caledonia fluctuated considerably, bringing from $1.35 up to $1.55. Other quotations noted were: Ophir, $1.60@$1.65; Yellow Jacket, 65c.; Sierra Nevada, 73c.; Gould & Curry, 40c.; Crown Point, 28c.; Potosi, 28c.

On the San Francisco & Tonopah Exchange business was more active than during the preceding week. Transactions were considerable, and prices were fairly well maintained, in some cases rising considerably. Some quotations noted are: Tonopah-Nevada, 88; Belmont, $2.30@$2.40; North Star, 46@48c.; Gypsy Queen, 25@30c.; Paymaster, 22c.; Lucky Tom, 15c.; Rescue, 15c.; Colehan, 28c.; Esperanza, 8c.

In oil shares, business was rather quieter, but prices were fairly well maintained. Home Oil was steady at $3.15; while Kern River sold up to $14; Monarch Oil was quoted at 16c., and Lion at 7c. The lower-priced stocks seemed to be most in favor.

COAL TRADE REVIEW.

New York, June 23.

ANTHRACITE.

The demand for anthracite shows little or now falling off, though the fear of a general strike of the miners has ceased to affect the market. The unseasonably raw, damp weather makes retail buying more active than usual at this season of the year, but the real reasons for the widespread demand are the complete clearing up of stocks last winter, and the general desire of dealers and of many householders

to lay in liberal supplies early. It is safe to say that there will be more coal bought by actual consumers in the three months ending July 1 this year than in any years before.

The Conciliation Committee, according to reports from the mining regions, is going to have a busy time of it for the next few months. The miners will want the Committee to take up a lot of questions which, apparently, the Anthracite Strike Commission intended should be first taken up by the miners and the mine superintendents. However, hearings before the Committee should prove a safety valve for whatever unrest and desire to quarrel with the operators there may be among the miners.

The shipments from the mines in May are given as 5,156,449, and the estimated shipments for June as 5,400,000 tons, making a total of about 31,850,000 tons for the first half of the year.

In Lake Superior territory receipts at the docks are now heavy and will be heavier later on. Local demand is light, and is not expected to improve until fall. In Chicago territory demand continues strong—strong enough to ensure dealers of steady business for a month yet. Egg size is especially wanted.

Along the lower lakes and in Canadian territory demand fell off slightly with the passing of the strike scarce, but is still strong, and independent operators secure premiums of 25c. per ton for prompt deliveries. In the line trade farther east demand is still active, particularly in Pennsylvania territory. Along the Atlantic steaboard coal is most wanted, apparently, at points toward Cape Cod. Some orders for September delivery are reported. Sales agents at New York report orders enough to take all the coal they can supply for over a month yet. Little if any coal has gone into storage since April 1. The demand for steam sizes is generally good, except for some of the washery coals.

BITUMINOUS.

The Atlantic seaboard bituminous trade shows a slight improvement. Prices are firmer, and demand is picking up, particularly at points along the Sound. Shipments are still largely on contract orders. The demand from shoal water ports is strong enough to keep busy the small schooners offering charters, but shoal water business is not expected to be pressing before the latter part of July. The railroads continue to enforce demurrage charges on coal standing at tidewater, and in this way have greatly restricted the operations of speculators. Some sporadic strikes are reported in the mining regions, but they have no appreciable effect on tidewater business. Car supply along the Pennsylvania Railroad is short, probably because the new heads of transportation have not got things working smoothly yet. Shippers are not complaining much, as they can work along on the cars furnished.

In the far East trade is quiet, though considerable coal is going forward on old orders. Along Long Island Sound trade is more active than in weeks, orders are steadily increasing. There is a shortage of boats for Sound shipments. At New York Harbor points there is a steady, fair demand. In the all-rail trade buying is somewhat more active than it has been.

Transportation from the mines to tidewater continues satisfactory, coal running through in from four or five days to a week. Car supply at the mines continues variable, ranging from 50 to 75 per cent of the demand. In the coastwise vessel market large craft are in fairly good supply, and rates are weak. We quote current rates from Philadelphia as follows: Boston, 80c.; Salem, 85c.@$1.10; Portland, 80@85c.; Portsmouth, 85c.; Bath, 85@90c.; Bangor, $1.10; Saco, $1.10 and towages. From the farther lower ports rates are 10c. higher than above figures. From New York ports rates are 75@80c. to Boston, Salem and Portland, and 65@70c. to Sound ports.

Birmingham. June 22.

(From Our Special Correspondent.)

State Mine Inspector J. M. Gray announces that the production during the first six months of the year at the coal mines in Alabama will exceed the production for the first six months last year. The official report of the production in 1902 shows 10,329,479 tons, against 8,970,617 tons in 1901. It is fair to estimate the production for the year 1903 at over 12,000,000 tons, provided, of course, that there is no suspension of work on the part of the United Mine Workers of America. The joint conference on this week between the United Mine Workers and the coal operators as to a scale, effective July 1, will determine whether there will be a suspension of work or not.

The production of coke in this State is on the increase. During the present week the Sloss-Sheffield Steel and Iron Company will have had turned over to it the new coke ovens at Flat Top. With these in operation the company will be in position to supply its own needs of coke. It is stated officially that the company will no longer purchase coke from outside parties after August 1. The company has been using something like 2,000 tons of coke monthly from outside sources.

Chicago. June 22.

(From Our Special Correspondent.)

The anthracite market continues to be marked by heavy sales, both local and out-of-town. Consumers are apparently laying in their stocks of winter coal as early as possible, and the most enthusiastic advocate of smokeless and other high-grade bituminous coals no longer expects any pronounced increase of demand for anything but anthracite from the householder. That the movement is one of the consumer chiefly is shown by the fact that retailers are greatly behind their orders, for the most part, and are, locally at least, disposing of their anthracite as fast as they receive it. In the country, dealers are said to be stocking up somewhat more in advance, but there also the consumer is treading close upon the heels of the retailer, in purchases, according to good authorities. There is every prospect that business in anthracite will continue good into midsummer.

There is but a light demand for Eastern bituminous. Smokeless is selling at $3.50@$3.60, whenever it can be sold. The demand is light. Hocking is in good demand at the same price as smokeless. Youghiogheny sells fairly well for the season at $3.60@$3.75. The product of Western mines is somewhat more in demand, the restriction of shipments having caused a disappearance of the glut that existed a week ago, and prices are a little stiffer. Indiana and Illinois lump are quoted at $2@$2.25; run-of-mine is $1.60@$1.90. It is believed by dealers in Indiana and Illinois coal that their market will be much better next month than it has been this month, on account of the restrictive policy now being followed by the mine owners and operators. With improved methods of firing there seems bound to be a growing popularity of Western bituminous, and improved methods are coming into use steadily.

Cleveland. June 23.

(From Our Special Correspondent.)

The domestic coal trade has eased up. The possibility of a coal strike having been removed, many of those who seemed in a rush to buy their winter coal have not done so. Some of the dealers who had anticipated this rush, and wanted to meet it, now have a good stock on hand. The domestic shipment has been satisfactory, as the factories have all they need and the situation is strong.

The coke situation is also satisfactory. The railroads have been moving this material freely and no further talk of furnace suspensions, on account of coke shortage, has been heard. Prices have not eased off any, the best foundry coke being quoted at $4.25 per ton at the oven.

The lake situation is still very active, and the boats are congesting at the upper ports. In some instances boats are taking double their usual time on a round trip. The reason is that the coal movement to date has been so heavy, that the upper lake railroads have not been able to take it away. The supply at the lake docks this week has been rather short. The rates have not changed from 50c. to Lake Michigan and 40c. to Lake Superior. Shippers are keeping the rates up to induce boats to go up loaded, which they are doing now. Prices of coal have not changed, although no sales have been reported of late. They are: $2.45 for Pittsburg and West Virginia lump, and $2.35 for Ohio lump.

Pittsburg. June 24.

(From Our Special Correspondent.)

Coal.—The operation of the mines in the Pittsburg District during the past few days has been unusually satisfactory. Only a lack of sufficient railroad cars will prevent the production this year from exceeding all former years by several million tons. The rivers were navigable late last week, and the Monongahela River Consolidated Coal and Coke Company was able to ship about 3,000,000 bush., and bring back a large number of empty boats and barges, which will insure steady operation of the mines for some time. The rain last night and to-day has brought a boating stage and it is expected that fully 10,000,000 bush. will go out on this rise.

Connellsville Coke.—There has been a falling off in both production and shipment, but the supply has been equal to all requirements. It is reported that furnace coke can be bought as low as $2.75 a ton at the ovens, but $3 continues to be the price quoted. Foundry coke is held at $4@$4.50. The *Courier*, in its last report, gives the production for the week at 249,019 tons, a loss of over 2,000 tons. The shipments were 11,216 cars, distributed as follows: To Pittsburg and river tiples, 4,335 cars; to points west of Pittsburg, 5,342 cars; to points east of Connellsville, 1,539 cars. This was a decrease of 476 cars compared with the shipments of the previous week.

San Francisco. June 20.

(From Our Special Correspondent.)

Trade has been quiet, with about the usual arrivals. Stocks are good, except in Eastern coals, which are in light demand. Prices show no change.

Yard prices to dealers for Pacific Coast coals in large lots are as follows: Wellington and New Wellington, $8; Richmond, $7.50; Rosslyn, $7; Seattle and Bryant, $6.50; Coos Bay, $5.50; white ash, $5. Rocky Mountain coals in car-load lots are quoted at $14 for Colorado anthracite, and $8.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal in cargo lots is at present nominal, but quotations are $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots sells as follows: Welsh anthracite, $13; cannel, $8.50; Brymbo, $7.50; Wallsend, $7.50.

Foreign Coal Trade. June 25.

Export trade here continues light, and there is very little doing beyond the usual trade with the West Indies and South America.

Exports of coal from Great Britain to the United States for five months ending May 31 were, in long tons:

	1902.	1903.	Changes.
Atlantic ports	4,047	1,028,724	I. 1,024,677
Pacific ports	31,865	35,658	I. 3,793
Total	35,912	1,064,382	I. 1,028,470

The exports to Atlantic ports in May were 21,534 tons only, showing a heavy decrease from the earlier months of the year.

The total exports of fuel from Great Britain for the five months ending May 31 were, in long tons:

	1902.	1903	Changes.
Coal	16,481,291	18,046,133	I. 1,564,842
Coke	231,742	262,586	I. 30,844
Briquettes	432,357	351,291	D. 81,066
Total	17,145,390	18,660,010	I. 1,514,620

In addition to these exports, there were 6,475,244 tons of coal sent abroad for the use of steamers engaged in foreign trade; an increase of 563,067 tons over last year.

Messrs. Hull, Blyth & Co., of Cardiff and London, reports under date of June 13, that there is no alteration in the tone of the Welsh coal market, which remains quite firm. There is a good supply of tonnage in stock. Quotations are: Best Welsh steam coal, $3.78@$3.84; seconds, $3.72; thirds, $3.54; dry coals, $3.24; best Monmouthshire, $3.42@$3.48; seconds, $3.30; best small steam coal, $2.28; seconds, $2.10; other sorts, $1.92.

The above prices for Cardiff coals are all f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market is unchanged. Rates continue steady, but business is quiet. Some rates quoted from Cardiff are: Marseilles, $1.50; Genoa, $1.38; Naples, $1.38; Singapore, $2.64; Las Palmas, $1.44; St. Vincent, $1.56; Rio Janeiro, $2.10; Santos, $2.40; Buenos Aires,, $1.80.

IRON TRADE REVIEW.

New York, June 25.

While the market continues essentially a waiting one, some revival of buying in foundry iron is reported. This, however, is mainly in comparatively moderate lots for immediate use, showing that some foundries are approaching the bottom of their stock piles, and need new supplies at once. The Southern iron reduction does not seem to have stimulated buying much, except in the form of small lots, and purchasers evidently expect a further reduction.

While there has been talk of fixing the prices of steel, nothing has bee nactually done in that direction. Most kinds of finished material are, however, selling at somewhat less than they have been; but few or no large contracts have been placed. The only exception is in steel rails. At a meeting last week, the price for 1904 delivery was fixed at $28 per ton at mill for standard sections, the same figure that has prevailed during the current year. The first order placed for 1904 was by the Pennsylvania Railroad Company, the details of which are given in our Pittsburg letter below. The Union and Southern Pacific interests are also reported to have placed an order for 100,000 tons. It is quite probable that several hundred thousand tons ordered for this year will be carried over to 1904 delivery.

Import business is rather quiet, the returns for May showing a considerable falling off in the imports of pig iron and steel billets, as compared with the previous months of the year.

Exports of pig iron from Great Britain to the United States for the five months ending May 31 were 220,193 tons, against 55,584 tons in the corresponding period last year. Exports of steel ingots and billets were 7,999 tons, against none last year.

Birmingham. June 22.

(From Our Special Correspondent.)

Alabama furnacemen announce that the pig iron market conditions are satisfactory, and that a larger number of sales of iron are being made than two months ago. It is admitted, however, that the sales are in small lots. It is taken as an indication that there is need for the iron, and while the consumers

propose to purchase just as they need the iron, the buying is encouraging. There will be no further reduction in iron prices just yet, say the furnacemen, when questioned on that score. There are no indications that such a course is necessary, they say. The production of pig iron is holding up fairly well. Some of the furnaces are inclined to fall off in output, but, generally speaking, the production is about the same as it has been all along. The Tennessee Coal, Iron and Railroad Company during the past week blew in one furnace and blew out another. The Sloss-Sheffield Steel and Iron Company has six furnaces in blast.

No little attention is now being given to the joint conference between miners and operators of coal mines which started to-day. The miners have presented their scale. It is not likely that the operators are going to grant the demands made by the miners and mine workers. There will be a lengthy discussion. There is anticipation that a settlement will be arrived at before July 1, which will prevent any suspension of work at the mines, and therefore will not interfere with the production of pig iron in this State.

The following quotations prevail in this district: No. 1 foundry, $15.50; No. 2 foundry, $15; No. 3 foundry, $14.50; No. 4 foundry, $14; gray forge, $13.50@$14; No. 1 soft, $15.50; No. 2 soft, $15.

A local foundryman is quoted as saying that he had purchased No. 2 foundry, at $14.50 per ton. This foundryman does not buy in very extensive lots, and may have caught a little bargain.

The Williamson Iron Company's furnace located in this city has been averaging 90 tons of iron daily. The furnace was built for 80 and 85 tons of iron a day, but its record has been splendid. A new blowing engine is being added to the machinery, and before the end of another month it is expected that the production of the little plant will be run to 100 tons per day. The product is used principally at the Dimmick Pipe Company's plant at North Birmingham, besides being placed on the open market, where it finds a ready sale. The remarkable operations here are the subject of considerable comment in this district.

In finished iron and steel circles in this section there is nothing new this week. No shut-down at the rolling mills is looked for until next month, when it is believed that some repairing will necessitate a suspension of work for a few weeks. At the steel plant there is much activity with a good demand for the product. The steel rail mill department is working on both day and night turn now, filling orders. The plow works at Ensley, which have been out of operation for four or five months, during which time they changed hands, and have undergone considerable improvement, will resume operations about July 1. The Empire Plow Company, of Cleveland, Ohio, is now in control.

Chicago. June 22.

(From Our Special Correspondent.)

The slight flutter upward of the pig iron market, of a week ago, has died into almost a dead calm. Stagnation bids fair to follow for an indefinite period. Selling agents are speculating how long they can hold out against the declining conditions. They say they can hold out all summer if necessary, but they do not like the prospect. To some it appears that the bottom of the decline will not be reached before a $12 price at Birmingham, for fall deliveries, is reached; others are more hopeful, and declare that there will not be nearly as gerat a slump. Already No. 2 Southern is said to be selling at close to the $14 mark, Birmingham, which means $18.35, Chicago. Nominally, the price is $15, Birmingham, or $19.35, Chicago. Agents are fighting for small sales. During the week there has probably not been more than 1,000 tons disposed of in one lot. Northern is the same as Southern as to price and general conditions. It is bringing perhaps 50c. to $1 more than the prices for fall delivery, on short-time deliveries. There are, however, few purchases even for quick delivery.

Coke continues over-plentiful and low. There has been a great amount on track that had to be moved on account of demurrage, and this condition bids fair to continue for another week. Cut prices are the rule on spot business. Sales have been made probably under the $5 mark, around which most of the business has been done. Contract coke is still $6@$6.50.

Cleveland. June 23.

(From Our Special Correspondent.)

Iron Ore.—The situation on the lakes is unchanged, a sharp contention being on over the carrying rates on ore, but without a change. The market displays a good call for tonnage and indicates a free movement. The carrying charges are: 80c. from Duluth; 70c. from Marquette and 60c. from Escanaba. The prices have not changed, but no sales are reported. They are: $4.50 for bessemer old range and $4 for bessemer Mesabi.

Pig Iron.—The buyers of foundry have not yet started in any volume. Some material is being disposed of at the old list of prices, $20, Valley furnace, for No. 2, ruling, but it is realized that this is not the second half basis which will approximate $19@$19.50, Valley furnace. The present production is enormous, and the consumption keeps pace with it. No stocks are collecting. The prices of bessemer pig are still holding as previously quoted, the wide range being due to the difference of attitude between the Association and the independent furnaces. The quotations are: $18.50 to $19.35 in the Valley. Basic producers are holding off until the possible production during the second half may be estimated. The prices have held at $18.75, which is as near as the market could be quoted now.

Finished Material.—The call for structural has been easier. Specifications, however, have been heavier than previously. The deliveries run from two to three weeks to four or five months, according to the material needed. The mills are quoting 1.60c., Pittsburg, and the jobbers are getting 2.15@2.25c., out of stock.

Light rails are in good demand. Prices hold at $28 for standard sections, and $36, Pittsburg, for light rails. The plate trade has been weak. Some orders have come in, but not a rush of them. Specifications have been better than heretofore, and this aspect of the trade is promising. The smaller mills are asking 1.80@2c., Cleveland, and sales are made according to the urgency of the need of the buyers. The big mills are taking care of most of that business, being in position to make immediate delivery almost on any sort of a contract, universal or sheared plates. The sheet trade has not improved, and the market is beginning to get a little dull as to new business with nothing of importance showing up. Prices have not changed, being based on 3.15c. for No. 27 black sheets, out of stock, and 4c. for the same gauge of galvanized sheets, out of stock. Bars have been strong. The big buyers have not yet covered, and some of the smaller concerns are covering only until January 1. The market has sagged a little. Bar steel is quoted, bessemer, 1.60c., Pittsburg, and open-hearth, 1.70c., Pittsburg. Bar iron is quoted 1.70@1.80c., Youngstown. Billets are off the market, and no quotation is possible.

Old Material.—The market is absolutely dead here, and no quotations are possible.

Philadelphia. June 24.

(From Our Special Correspondent.)

Pig Iron.—The entire market is at a standstill, but it is more anxiously awaiting developments than at any previous time. The amount of business heard of during the past week has been unimportant. There are one or two indications that foundry and forge consumers are willing to buy, as has been shown by offers made for both kinds of iron by way of sounding the ground. While the larger pig iron interests are ready to do business, they do not propose to be pushed or led into the establishment of quotations by any action of buyers. The leading pig iron makers have all along stuck to the position that the crude iron requirements are sufficient to absorb all the iron being made, and that there is no occasion for a break, but they recognize the wisdom of an adjustment which is now practically effected. Buyers do not admit the correctness of these views, and are holding off as though they believed a further decline of at least 50c. is inevitable. They are strengthened in this view by the fact that a few sales have been made by small producers at something below the current rates. The rumor of a further cut in Southern iron tends to unsettle the situation. In a general way quotations may be fairly given at $20.25@$21 for No. 1X, foundry; $19@$19.75 for No. 2X foundry; No. 2 plains, $18.50; gray forge, $18; basic, $18.50.

Billets.—The only change in the situation over a week ago is that there are several parties who would like to increase their billet contracts, and one or two of them, it is understood, on the point of doing so. The prevailing price is $30, but there is a hesitancy among billet consumers to take any decided action until there are more developments.

Merchant Bar.—The merchant bar iron in middle and eastern Pennsylvania has been unsettled by pretty well established instances of sales of bar in large lots at enough below the published rates to lead to doubts as to the permanency of prices. Steel bars are quoted at 1.70c.; refined iron, 1.80c.

Sheets.—There is very little to note in this branch. Some business is being done; it is of a retail character.

Skelp Iron.—Skelp iron in this market holds its own without very much new business.

Boiler Tubes.—Quite a good volume of business is reported by agents of mills. Among buyers it is found that where urgent deliveries are demanded the accommodation has still to be paid for.

Merchant Steel.—Prices are stable. Small orders are pouring in.

Nails.—The past few days have developed a little better demand for nails, as the building requirements are somewhat larger. Quite an amount of new building work has just been entered upon throughout our entire territory.

Plates.—Plate people say that there is enough new work opening up, and enough business, mainly in small orders, coming in to give strength to the situation. At the same time the total volume of business is not quite so heavy. Deliveries are made with more promptitude, and buyers for early delivery are not obliged to pay premiums. The usual midsummer suspension has been discounted. Quarter-inch plate is quoted at 1.75c. in car-lots; universals, 1.80c.; flange, 1.90c.; marine, 2c.; fire-box, 2.10c.

Structural Material.—The market is quiet, although office people say that there is a large amount of business to be had.

The mills will undoubtedly have all the business they can comfortably handle; much of the July business will be made up of orders for material for small requirements. Quotations continue at 1.73½@1.80c. in large lots, and from 1.85@2c. in small lots.

Old Rails.—Old iron rails are quoted at $23.50; old steel rails, $21.

Scrap.—Steel scrap is selling, while other kinds are neglected. No. 1 wrought railroad can be had at $21; country scrap is held at $19.50; heavy steel scrap, $21. The market is rather quiet, owing to the belief among a few of the larger buyers that prices will weaken in sympathy with pig.

Pittsburg. June 23.

(From Our Special Correspondent.)

The outlook for the iron and steel markets is brighter than for several weeks past, and it is doubtful if anything will occur to disturb the prospects. A buying movement has started in foundry iron, and a number of sales have been recorded within the last few days, and although the No. 2 grade has been held at an unusually high figure compared with the prices for bessemer the cut on ruling rates has not been more than 50c. a ton. Purchases have only been for early requirements, and there is nothing to indicate that the buyers had great confidence in the future, but that they needed the iron. The furnaces do not seem anxious to encourage heavy buying by making a stiff reduction in prices, and foundry may continue to sell in the next few weeks around bessemer prices. The Southern furnaces so far have not succeeded in doing much business in the Pittsburg District, despite the fact that the rates are lower than for the Northern product. A further cut in Southern forge and foundry iron is evidently looked for, and there is not likely to be any large purchases until there is some assurance that the bottom figures have been named. Consumers of pig iron want shipments anticipated, which indicates a healthy condition of the market, showing that there are no surplus stocks in the mills. It is reported that the United States Steel Corporation has opened negotiations for the purchase of another lot of pig iron, as it did not get all that was needed for the third quarter. No purchases have been made so far for fourth quarter iron, and furnaces are not anxious to close any contracts for late shipment. Importations of pig iron have practically been discontinued, and it is not believed that much foreign iron will come into this market during the rest of the year. Reports show that the imports for April amounted to 99,000 tons, and for May but 45,000 tons were brought to this country. The cutting off of foreign shipments will greatly strengthen the domestic market. All the blast furnaces in the Pittsburg District, with the exception of Furnace H at Braddock, which was blown out to-day for re-lining, are in full operation, and the Valley furnaces are turning out the usual production. Work on the two Donora furnaces is being rushed, and it is expected that they will be ready to put in blast early in the fall.

As indicated last week the price of steel rails was fixed for 1904 at $28, the price that has ruled for the past two years and this year. The Pennsylvania Railroad was the first in the market placing an order for 202,000 tons, the largest annual contract it has ever made. Of this the United States Steel Corporation gets 118,000 tons, the Cambria Steel Company 42,000 tons and the Pennsylvania Steel Company 42,000 tons. The Carnegie Steel Company will roll about 90,000 tons of the Corporation's order at its Edgar Thomson works at Braddock, and the National works at Youngstown; the rest likely will go to the works of the Illinois Steel Company in Chicago. While the order of E. H. Harriman for 100,000 tons for the Union and Southern Pacific railroads may not have been actually placed, it is understood that this amount will be contracted for at an early date. It is now predicted that fully 400,000 tons of this year's rail orders will be carried over into 1904. So far there has been no official announcement of prices of other finished lines of steel, but it is reliably reported that at a meeting of the heads of the different subsidiary companies of the Corporation it was practically decided that the present rates for plates, structural material and merchant steel bars will be continued for another year. Advances are likely to be ordered in sheets and probably tin plate. Prices of wire products may not be disturbed. When these prices were

established two years ago pig iron and crude steel were lower than they are to-day, and there is no apparent reason for a cut in prices of finished material.

During the week the Amalgamated Association of Iron, Steel and Tin Workers made a settlement of the iron wage scale for the mills formerly owned by the American Steel Hoop Company, and operated under the association scale. These plants are now owned by the Carnegie Steel Company, which does not recognize the Amalgamated Association at any of its plants. In order to get a scale signed for these mills the signature of the American Steel Coop Company was accepted. This occasioned some comment, as no such concerns now exists.

Pig Iron.—Bessemer pig iron continues quiet, although a few small sales were made for early shipment. No buying has yet been done for the fourth quarter, but several inquiries have been received and some sales may be closed shortly. Bessemer is held at $18.75@$19, Valley, and $18.50 probably could be done for the last quarter. A number of sales of foundry No. 2 were closed during the week aggregating about 10,000 tons. The price ranged from $19.50 to $20, Pittsburg, a drop of 50c. from last week's quotations. Gray forge continues inactive and furnaces quote $19@$19.25, Pittsburg.

Steel.—The market is not particularly active, and prices of billets are not as firm as a week ago. A sale of 5,000 tons of bessemer billets is reported at $29. The plate and steel bar markets are in good shape, all the mills being busy, and the price remains at 1.60c.

Sheets.—The American Sheet Steel Company has orders on its books for 60 days, and continues to quote 2.75c. for black sheets, No. 28 gauge, and 3.85c. for galvanized. Independent mills are not getting all the steel they need, and the market is firm.

Ferro-manganese.—There is no change in the market and English ferro remains at $50@$52.50.

St. Louis. June 22.

(From Our Special Correspondent.)

Pig Iron.—There is a dullness and apathy in all departments of the iron trade. No pig iron sales of any pronounced tonnage have been made. It is evident that users of iron in this section are determined not to come into the market until their present stocks are nearly exhausted. Shipments and receipts, which were greatly interfered with during the past two weeks, are now normal.

Finished Material.—All lines hold their prices well, in spite of the dullness in pig iron. The business in tubular goods has been unusually brisk. Machine shop supplies are also in demand. Structural material still calls for a premium on delivery of small lots.

New York June 24.

Pig Iron.—Some sales are reported at the lower prices, and the market is better. We quote for early delivery, Northern iron at tidewater: No. 1X foundry, $19.75; No. 2X, $18.75; No. 2 plain, $18.25. For Southern iron on dock, New York: No. 1 foundry, $19.25; No. 2, $18.50; No. 3, $18.25.

Plates.—Demand is not as active as it was. Sheared plates are quoted: Tank, ¼-in. and heavier, at 1.80@2c.; flange, 2@2.05c.; marine, 2.10@2.20c.

Bar Iron and Steel.—We quote for large lots on dock: Refined bars, 1.80@1.95c.; soft steel bars, 1.78@1.90c.

Steel Rails.—The quotation remains $28 for standard sections, f.o.b. mills for 1903 delivery; light rails, $33@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections.

Structural Material.—The labor situation shows little signs of immediate change, and buying locally is light. We quote for large lots at tidewater: Beams, angles, channels and tees, 1.75@2c.

Cartagena, Spain. June 6.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—During the week shipments included two cargoes, 4,770 tons, dry ore, to Great Britain.

During the last week all operations connected with smelting and mining in the Cartagena Sierra have been at a standstill, owing to the general strike of all the laborers in the mining district, which commenced unexpectedly early in the week, and without any previous demands being made by the men. From all appearances a few hundred men waylaid and stopped the men on the roads to their work, and as several thousands are anxious to continue work, it may be anticipated the strike will be of short duration; meanwhile, there is an entire absence of riots or disorders, both the military and civil guards having been sent in considerable force to the district. The principal mining and smelting operations take place in the district of La Union, a town of about 30,000 inhabitants, situated about 8 miles from Cartagena, which is the central mining district, whose export is made from the port of Cartagena.

Prices are firm at 6s. 9d.@7s. per ton, f.o.b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton, f.o.b. Cartagena. No shipments have been reported this week.

Other Exports.—Other exports included 50,000 kgs. copper matte to Marseilles.

CHEMICALS AND MINERALS.

(See also Prices-Current, page 992.)

New York, June 24.

In another week most consumers will be facing the customary vacation season, and business will practically stand still. Already there are indications that the fall trade will show some improvement, but unfortunately lower prices may rule in many lines, owing to keen competition.

An attempt is being made abroad to create interest in mica deposits found in Northern Transvaal. It is claimed that some excellent specimens have been obtained, and to attract attention it is added that the best quality mica, suitable for electrical purposes, brings about £250 ($1,215) per ton. No wonder there are so many "mica hunters." It is absurd to quote such a high price, as the bulk of the mica consumed by the electrical industry, sells anywhere from $168 to $560 per long ton, seldom at a higher price, unless a special pattern is desired, and even then the price is much less than our foreign writers would have the public believe. Some time ago inquiry was made at this office with regard to opening a market for South African mica in the United States, but as Indian mica, which is well known, can be imported cheaply, the idea was abandoned. Possibly good mica is obtainable in the Transvaal, as is being mined in Zululand, but it must cater to other markets, as the American is well supplied.

Cyanide of Potassium.—Imports are more frequent, but in the aggregate do not amount to very much. Recently British cyanide was shipped to this country at an average of 18.9c. per lb. New York importers quote on the basis of 20c., but as new orders are limited, a large buyer can probably shade this figure.

Bleaching Powder.—What to ask to induce buying is perplexing sellers, but as the bulk of the stocks are held by jobbers, no aprehension is felt by importers. Prime foreign bleach can be purchased in New York at $1@$1.12½ per 100 lbs., while domestic is freely offered at 75c.@$1 per 100 lbs., f.o.b. works.

Copper Sulphate.—Prices are again weaker at $4.25@$4.37½ per 100 lbs. Recently 20 tons of British copper sulphate were exported to America, which will be delivered on contract. In May Great Britain shipped 7,100 long tons to all countries, bringing the total for the five months to 41,713 tons, which is 9,760 tons better than last year. The exports this year had an average f.o.b. value of $92.64 per long ton, which compares with $95.71 in 1902; showing a fall of $3.07, equivalent to 3.2 per cent.

Acids.—The commercial acids are in moderate demand, with here and there an order to break the monotony. Prices remain unchanged.

We quote as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°....	$1.50	Oxalic, Com'l..	$5.25@$5.50
Muriatic, 20°....	1.60	Sulphuric, 50°,	
Muriatic, 22°....	1.75	bulk, ton ...	13.50@14.50
Nitric, 36°.....	4.37½	Sulphuric, 60° .	1.05
Nitric, 38°.....	4.75	Sulphuric, 60°,	
Nitric, 40°.....	5.00	bulk, ton ...	18.00@20.00
Nitric, 42°.....	5.37½	Sulphuric, 66°,	1.20
		bulk, ton ...	21.00@23.00

Brimstone.—There is no trouble in buying best unmixed seconds at a discount, though market quotations are $22.25 per ton for spot, and $22@$22.25 for shipment. Best thirds are about $1 less than seconds, but business in this quality is limited. Recently 5,000 bags of sulphur were imported at San Francisco from Hong Kong, probably Japanese mineral. This makes 25,376 bags Japanese sulphur received at that port in about six weeks. It is also of interest to mention that a week ago San Francisco exported 2,225 bags of sulphur to Mexico.

The imports of brimstone into Great Britain in May were 2,183 long tons, making 8,113 tons since January, which compares with 10,518 tons last year; showing a decrease of 2,405 tons, or about 23 per cent.

Pyrites.—There has been active chartering recently, and rates from Huelva, Spain, to Atlantic ports fluctuated between 10s. ($2.40) and 11s. ($2.64). Evidently importers are doing a very satisfactory business, and at present freight rates, profits ought to be good. Domestic producers are busy filling regular contract orders at unchanged prices.

It is noteworthy that of late American consumers have increased their holdings of pyrite land in Canada, particularly in Ontario. In recent years there has been a tendency noticeable among large acid makers to control their raw material supply for economical reasons.

In May Great Britain imported 66,893 long tons of copper and iron pyrites, having an average sulphur content of 31,440 tons. Since January 1 the imports have been 325,840 tons, equivalent to 154,145 tons sulphur, which compared with the corresponding five months last year shows an increase of 20.3 per cent.

We quote: Domestic pyrites, $5 per ton for lump ore, f.o.b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Notwithstanding the arrivals, prices continue firm, owing to the strong market for futures and the high ocean freight rates. Spot is quoted at $2.05 per 100 lbs., arrivals, $2.02½@$2.05, and futures, $1.95@$2.

The statistical position of nitrate of soda in Europe in the five months ending May 31 is shown below, in long tons, comparison being made with the corresponding period last year:

	1902.	1903.	Changes.
Exports to Europe	441,668	377,019	D. 64,649
Imports	545,310	575,950	I. 30,640
Deliveries	658,320	772,070	I. 113,750
Loadings for Europe, June 1	37,016	49,932	I. 12,916
Visible supply, June 1	378,600	257,700	D. 120,900

Noteworthy features this year are an increase of 17.3 per cent in deliveries, and a decrease of nearly 32 per cent in the visible supply on June 1. Not in years has the visible supply been so small.

Chilean Nitrate of Soda Market.—Messrs. Jackson Brothers, of Valparaiso, write us as follows, under date of May 2, that there has been a large demand for all positions, especially for the refined quality, principally for Europe. Sales of 95 per cent have been made at 6s. 4½d.@6s. 5½d. for prompt delivery, at 6s. 5d.@6s. 6d. for July-August, and at 6s. 5½d.@6s. 6¼d. for August-December; for refined, 6s. 8½d.@6s. 9½d. has been paid for May-June, 6s. 7s.@6s. 8½d. for August-December, 6s. 7d.@6s. 7½d. for January-March, all alongside terms. The market closes quiet in the ordinary quality, but refined continues in demand at the top prices paid. Exports for the first 4 months this year amount to 8,579,000 qtls., against 9,729,000 qtls. during the same period in 1902. We quote: 95 per cent, May-June, 6s. 5d.; July, 6s. 5½d., August-December, 6s.6d., and refined, 6s. 9d. May-September, all ordinary terms sellers. The price of 6s. 5d., with an all-round freight of 17s. 6d., stands in 8s. per cwt., net cost and freight, without purchasing commission. Sales for the fortnight were 755,000 qtls., and re-sales, 71,000 qtls.

Peruvian Guano.—An effort is being made to increase the consumption of this valuable fertilizer, and for that reason Messrs. Edmund Mortimer & Co., of New York, have been appointed the sole selling agents in the United States by the Peruvian Government. So far this year the imports from Lobos de Afuera, one of the guano islands off the coast of Peru, amount to 12,000 tons, and judging from renewal orders next year's receipts will total about 20,000 tons at least. Genuine Peruvian guano is too well known to need introduction, as it has for many years been used extensively as a fertilizer, and last year Europe alone imported 60,977 tons. The imports into the United States recently show an average analysis of 3.50 per cent ammonia, 4 per cent potash, and 20 per cent phosphoric acid. Purchasers of 100-ton lots in bulk, ex-vessel at New York, Baltimore or Charleston, can place contracts as low as 52½c. per unit for the phosphoric acid, $2.65 for ammonia and 75c. for potash, which, on the above analysis, would be $22.78 per short ton. Ton lots, packed in 200-lb. burlap bags can be had at $27.50, delivered f.o.b. cars at the ports named. These prices are considerably less than were obtained some years ago, when $40 to $60 or even more was paid by large consumers.

Sulphate of Ammonia.—Domestic production of gas liquor is on the increase, and in several localities the by-product coke oven is meeting with better favor. Undoubtedly the good prices obtained for sulphate of ammonia is influencing production, and as the consumption is growing there is hope that the American industry will continue to gain on its foreign competitors. Momentarily 24@25 per cent gas liquor sells in New York at $3.15@$3.17½ per 100 lbs., while future shipments are obtainable at $3.05@$3.10, according to position.

Phosphates.—Six months have passed, and of the many happenings, the increased exports and improved prices are, perhaps, the most interesting. Germany, Italy, France and Sweden are our best customers. An encouraging feature is that superphosphate manufacturers abroad have bought larger quantities of Florida land pebble, primarily, because they find it a

superior article to the best African phosphate, and, secondly, the difference in price is small. Florida high-grade rock also shows heavier buying, but Tennessee and South Carolina phosphates are in smaller demand. In the cases of Tennessee and South Carolina miners are busy attending to domestic trade, although the former are still making exports on regular contracts, but the quantity does not vary much from last year.

In foreign producing centers there is much activity. At Gafsa, in Tunis, the shipments in April were 28,971 metric tons, making 89,811 tons since January. These shipments were made from the port of Sfax, and the ocean freight rate to European markets varied from 7s. to 8s. 6d. ($1.66@$2.04), while the average c.i.f. price fluctuated between $5.47 and $6.71 per ton, or from 4½@5⅝d. per unit.

The imports of phosphates from all countries into Great Britain in May amounted to 21,199 long tons, making 151,194 tons for the five months, as against 146,945 tons last year; showing an increase of 4,249 tons. A large part of these phosphates was received from America.

Phosphates	Per ton F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.00@$7.50	7¼@7¾d.	$11.31@12.09
*Fla. land peb. (68@73%)	3.50@ 3.75	5½@5¾d.	7.70@ 8.05
†Tenn., (78@82%) export	4.00@ 4.25	6½@7d.	10.40@11.20
†Tenn., 78% domestic	3.75@ 4.00	.....	.....
†Tenn., 75% domestic	3.50	.....	.....
†Tenn., 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡S. Car. riv. r'k (55@66%)	2.75@ 3.00	5¼@5⅝d.	5.95@ 6.53
Algerian (63@70%)	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	5¼@6d.	6.30@ 7.20
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl (80@85%)	.....	7¼@7¾d.	12.04@12.87

* Fernandina, Tampa, Brunswick, Savannah or Port Inglis. † Mt. Pleasant. ‡ On vessels, Ashley River.

METAL MARKET.

New York, June 25.

Gold and Silver Exports and Imports.

At all United States Ports in May and Year.

Metal	May. 1902.	May. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$1,068,407	$14,488,268	$19,884,712	$18,819,895
Imports	1,497,053	1,462,845	9,100,887	10,600,646
Excess.	E. $471,354	E. $13,025,423	E. $10,783,825	E. $8,219,249
Silver:				
Exports	$3,785,305	$2,148,412	$19,277,968	$15,875,563
Imports	1,946,811	1,613,183	10,417,885	8,289,983
Excess.	E. $1,818,494	E. $535,229	E. $8,860,083	E. $7,585,57

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending June 24, and for years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports	Total Excess, Exports or Imports.
Week	$2,067,420	$402 4 6	$434 315	$3.141	E. $2 096,118
1903	17,048,651	3,371 89	8.782 921	1,047,470	E. 21,422,222
1902	16,495,762	1,315,282	13 6e7.670	665,007	E. 28.2-3,192
1901	24,938,088	1,291,348	16,766 5 5	1.936,690	E. 38,497,440

The gold exported this week went principally to Bremen and Paris; the silver to London and Havre. The gold imports were principally from Havre and Paris. To the years' totals of gold and silver exports are added shipments too late for the preceeding week.

Financial Notes of the Week.

While the liquidation on Wall Street still continues, general business remains in good condition, especially in the West; while manufacturing of all kinds is very active. During the present week, so far, gold to the amount of $2,600,000 has been taken for export, chiefly to France. It is understood that more will go out at the end of the week.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending June 20, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901	1902.	1903.
Loans and discounts	$902,755,300	$889,015,100	$904,821,100
Deposits	982,844,200	950,952,600	889,779,300
Circulation	30,887,500	31,350,100	44,008,800
Specie	173,296,900	173,292,700	158,459,700
Legal tenders	79,025,500	76,603,700	74,084,700
Total reserve	$252,322,400	$249,896,400	$232,544,400
Legal requirements	245,711,050	237,738,150	222,444,825
Balance surplus	$6,611,350	$12,158,250	$10,099,575

Changes for the week, this year, were increases of $1,459,100 in loans and discounts, $2,949,600 in deposits, $2,700 in circulation, $2,314,300 in specie, and $622,400 in surplus reserve; a decrease of $954,500 in legal tenders.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd.	$173,292,700	.....	$158,459,700	.....
England	189,963,295	.....	187,097,865	.....
France	513,952,800	$224,717,720	503,176,870	$224,998,710
Germany	198,985,000	73,599,000	186,130,000	61,885,000
Spain	70,735,000	94,185,000	72,730,000	102,495,000
Neth'l'ds	23,417,000	33,942,500	19,702,000	32,994,500
Belgium	15,890,000	7,945,000	15,083,335	7,541,665
Italy	80,775,000	10,505,500	90,275,000	11,245,500
Russia	372,305,000	45,030,000	388,580,000	44,015,000

The returns of the Associated Banks of New York are of date June 20, and the others June 18, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has been quiet. Supplies have been sufficient to meet the requirements of the trade. It is worthy of notice that the propositions of the American commissioners to maintain the greater stability in the trade and exchange relations of gold and silver have been favorably regarded.

The United States Assay Office in New York reports receipts of 96,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to June 11 are reported by Messrs. Pixley & Abell's circular, as follows:

	1902.	1903.	Changes.
India	£3,419,575	£3,143,525	D. £276,050
China	16,500	183,231	I. 166,731
The Straits	70,550	206,079	I. 136,529
Total	£3,506,625	£3,532,835	I. £26,210

Receipts for the week, this year, were £72,000 in bar silver from New York, £4,000 from the West Indies and £5,000 from Australia; also £72,000 in British dollars from Bombay, and £16,000 from the Straits; total, £169,000. Shipments were £75,900 in bar silver to India.

Indian exchange has been somewhat stronger under pressure of an increased demand for money in India. The Council bills offered in London were all taken at an average of 15.97d. per rupee. Buying of silver for India has been a little more active. There are no signs, however, of any considerable purchases for coinage by the India Council.

The foreign merchandise trade of Great Britain for the five months ending May 31 is valued by the Board of Trade returns as below:

	1902.	1903.
Imports	£222,135,337	£219,260,527
Exports	141,332,905	150,447,681
Excess, imports	£80,802,432	£68,812,846

This shows a decrease of £2,874,810, or 1.3 per cent, in imports; and an increase of £9,114,776, or 6.1 per cent, in exports.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.41	$0.43
Peruvian soles and Chilean pesos	.39	.42
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	4.88
Twenty marks	4.76	4.80
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

June.	Sterling Exchange	Silver N. Y. Cts.	Silver London, Pence.	Copper Lake, Cts. per lb.	Copper Electrolytic, Cts per lb.	Copper London, £ per ton.	Tin, Cts per lb.	Spelter Lead Cts. per lb.	Spelter N. Y. Cts. per lb.	Spelter S. L., Cts. per lb.
				14	13½			4.05	5.70	5.50
18	4.87⅜	52¾	24 1/16	@14¼	@14	56½	28¼	@4.10	@5.75	@5.60
				14	13½			4.05	5.70	5.50
19	4.87⅜	52⅞	24 1/16	@14¼	@14	56⅛	28¼	@4.10	@5.75	@5.60
				14	13½			4.05	5. 0	5.50
20	4.87⅜	53	24⅛	@14¼	@14	....	28¼	@4.10	@5.75	@5.60
				14	13½			4.05	5.70	5.50
22	4.87⅜	53	24⅛	@14¼	@14	54	28¼	@4.10	@5 75	@5.60
				14	13½			4.05	5.70	5.50
23	4.87½	52⅞	24 1/16	@14¼	@14	56⅜	2-¼	@4.10	@5.75	@5.60
				14	13½		28⅜	4.05	5.70	5.50
24	4.87½	5 ⅝	24¼	@14¼	@14	56½	@28½	@4.10	@5.75	@5.60

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures

Copper.—During the week under review, the market again ruled very dull indeed, although first hands have been more inclined to meet buyers' views and fair orders have been received from Europe. Home consumers, however, remain apathetic, and are covering only their immediate requirements.

Under the circumstances, quotations are nominal, viz.: 14@14¼c. for lake; 13½@14c. for electrolytic in cakes, wirebars or ingots; 13¼@13¾c. for cathodes; and 13¼@13½c. for casting copper.

The market for standard copper in London, which last week closed at £56 2s. 6d., opened on Monday at £56, and the closing quotations on Wednesday are cabled as £56 10s.@£56 12s. 6d. for spot and £56 7s. 6d.@£57 10s. for three months prompt.

Refined and manufactured sorts we quote: English tough, £60 10s.@£61; best selected, £61 10s.@£62; strong sheets, £69@£70; India sheets, £66@£67; yellow metal, 6¼@6⅝d.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week ending June 23, and for the year to date, are reported by our special correspondents as follows, in long tons:

Exports:	Week.	Year.
Austria	....	2,847
Belgium	....	809
France	....	10,517
Germany	300	12,218
Holland	360	18,997
Italy	15	1,426
United Kingdom	402	7,859
Other countries	429	3,224
Total copper	1,506	57,897
Matte	....	211
Imports:		
Copper	760	12,700
Matte	....	984
Ore	5,834	5,834

Exports this week show a falling off, but imports are larger. The copper ore imported came from Tilt Cove.

Imports of copper in all forms into Great Britain, with exports of the metal, for the five months ending May 31, are reported as below, in long tons; the totals showing the estimated content in fine copper:

	1902.	1903.	Changes.
Copper ore	41,427	35,096	D. 6,331
Matte and precipitate	34,614	30,701	D. 3,913
Fine copper	47,802	26,533	D. 21,269
Totals, fine copper	69,252	45,394	D. 28,858
Exports	21,577	22,968	I. 1,391
Balance	47,675	22,426	D. 25,249

Of the imports this year 297 tons of ore, 1,914 tons of matte and 8,988 tons fine copper were from the United States; against 379 tons ore, 9,320 tons matte and 27,968 tons fine copper last year.

Chilean Copper Market.—Messrs. Jackson Brothers report from Valparaiso, Chile, under date of May 12, that recent sales of bar copper were 18,576 quintals; quotations were $33.15, Chilean currency, per quintal, cash on shore. Sales of matte were 700 tons at an average of $14.49, currency per quintal, basis of 5 per cent copper. No sales of copper ore reported.

Tin.—The quotations have ranged within narrow limits, and transactions have not been out of the ordinary. The statistical position of the article remains good. The closing quotations are 28⅜@28½c. for spot and 27¾@28c. for futures.

The foreign market, which last week closed at £26 5s., opened on Monday at £127 10s., and the closing quotations on Wednesday are cabled as £127 10s.@£127 12s. 6d. for spot, and £125 15s.@£125 17s. 6d. for three months prompt.

Exports of tin from the Straits Settlements for the three months ending March 31 are reported as below, in long tons, of 2,240 lbs.:

To:	1902.	1903	Changes.
United States	6,086	7,897	I. 1,811
Great Britain	5,200	4,460	D. 740
Other Europe	1,754	1,230	D. 524
China and India	402	465	I. 63
Totals	13,442	14,052	I. 610

The increase was in exports to the United States direct.

Imports of tin into Great Britain, with re-exports of foreign tin, are reported as below for the five months ending May 31, in long tons:

	1902.	1903.	Changes.
Straits	9,964	8,538	D. 1,426
Australia	1,293	1,780	I. 487
Other countries	1,383	981	D. 402
Total imports	12,640	11,299	D. 1,341
Re-exports	9,198	9,182	D. 16
Net imports	3,442	2,117	D. 1,325

A large part of the metal reported from other countries is Bolivian tin.

Lead has been active, and a fair amount of business is reported at the lower values established last week. The closing quotations are 3.92½@4.02½c., St. Louis, and 4.05@4.10c., New York.

The foreign market has been very weak indeed, values ruling as low as £11 2s. 6d. At the close, however, a somewhat better feeling prevails, owing to reports indicating a serious falling off in the production in Australia, where long droughts are interfering. The closing quotations are cabled as £11 10s.@£11 15s. for Spanish, and £11 12s. 6d.@£11 17s. 6d. for English.

Imports and exports of lead in Great Britain for the five months ending May 31 were as follows, in long tons:

	1902.	1903.	Changes.
United States	25,005	15,730	D. 9,275
Spain	41,510	41,277	D. 233
Australia	27,665	26,668	D. 997
Other countries	6,554	9,446	I. 2,892
Total imports	100,734	93,121	D. 7,613
Exports	14,459	14,162	D. 297
Balance	86,275	78,959	D. 7,316

The lead credited to the United States is chiefly Mexican lead, refined here in bond.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull at the late decline. Missouri brands are quoted at 4c., and desilverized lead at 4.02½c.

Receipts of lead, as reported to the Merchants' Exchange, were only 2,100 pigs for the week, showing the effect of the floods and interruption of railroad traffic. Shipments were 23,005 pigs.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of June 6: The price of silver during the week has been 13.25 reales per ounce. Exchange is unaltered, at 34.29 pesetas to £1. Local quotations for pig lead on wharf have been 63.25 reales per quintal, which, on current exchange is equal to £10 6s. 6d. per ton of 2,240 lbs., f.o.b. Cartagena. Exports of pig lead have been 609,000 kgs. to London, and 64,000 kgs. to Marseilles; a total of 673,000 kgs. for the week.

Spelter.—The market has again assumed a more normal aspect, owing to the fact that shipments are beginning to come through from the West. Consumption in all branches is very satisfactory indeed. The ruling quotations are 5.50@5.60c., St. Louis, and 5.70@5.75c., New York.

The foreign market has been rather depressed, good ordinaries being quoted £19 15s.@£20, and specials, £20@£20 5s.

Imports and exports of spelter in Great Britain for the five months ending May 31 are reported as below, in long tons:

	1902.	1903.	Changes.
Imports	39,052	36,562	D. 2,490
Exports	3,651	3,268	D. 383
Balance	35,401	33,294	D. 2,107

In addition to the crude spelter there were imported 8,999 tons of zinc sheets and other manufactures, against 9,312 tons last year; a decrease of 313 tons.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is somewhat easier, and has sold at 5.50@5.55c. for prompt delivery; about 5.45c. for July and 5.40c. for August shipment.

Receipts of spelter, as reported to the Merchants' Exchange, were 1,235 slabs. This metal, as with lead, showing the effect of the floods. Shipments have gradually been resumed, and 21,835 slabs were forwarded during the week.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of June 6: The local market has completely collapsed, and all the recent important sales of blende, mine owners have bought in at their own reserved prices; notwithstanding buyers have quoted in some cases as much as 9 reales per quintal for 30 per cent basis, which, considering spelter is nearly down to £30, is considerably more than the ore is worth.

Antimony is quiet, without any special feature. The ruling quotations are: **Cookson's, 7½c.; Hallett's, 6⅞c.; Hungarian, French, Japanese, Italian and United States Star, 6⅞@6½c.**

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders, and $42@$43 for export. The London price is £8 12s. per flask, with the same quotation asked by second hands.

Imports and re-exports of quicksilver in Great Britain for the five months ending May 31 were as follows, in pounds:

	1902	1903.	Changes.
Imports	2,025,821	1,904,246	D. 31,575
Re-exports	897,333	841,722	D. 55,611
Net imports	1,128,488	1,152,524	I. 24,036

The larger part of the imports are from Spain and Austria.

Minor Metals and Alloys.—Wholesale prices, f.o.b. works, are as follows:

Aluminum.	Per lb.		Per lb.
No. 1 99% ingots	33@37c.	Ferro-Tungsten (37%)	28c.
No. 2 90% ingots	31@34c.	Magnesium	$2.75
Rolled Sheets	4c. up	Manganese, pure (N. Y.)	60c.
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	32c.
Nickel-alum	33@39c.	Mangan'e Cop. (30% Mn)	38c.
Bismuth	$2.10	Molybdenum (Best)	$1.82
Chromium, pure (N.Y.)	80c.	Phosphorus foreign	45c.
Copper, red oxide	50c.	Phosphorus American	70c.
Ferro-Molyb'um (50%)	$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20@25% N. Y.)	55c.		

Variation in prices depends on size of orders, deliveries, etc.

Missouri Zinc Ore Market. June 20.

(From Our Special Correspondent.)

As an illustration of the situation in the Joplin District it is worthy of mention that while the week's shipment includes the 583 tons of ore from the Empire Zinc Company's Gobbler Mine at Wentworth, it was only 508 tons larger than the previous week. It would seem apparent that but for the loading of this bin of reserve stock the week's shipment would have shown a big decrease. During this week loading began from the reserve bin of 250 tons at Reeds. This is the last of the large lots of ore remaining in the bin. It will all be loaded out this week and there will be from now on only the limited weekly output from which to supply the demand of the smelters. As this supply is upward of 1,000 tons short of this period of last year, it may be necessary for some of the smelters to "dead fire" a few blocks of their works until the supply can be increased. The producers are pressing every point to enlarge the output, but the heavy water makes it impossible even at the mines in operation to run full time. The pumping capacity is unequal to the additional weight of water, and breakages are numerous. A few more mines were in operation this week than last, and a few more are expected to resume operations next week, but the output is not increasing at the rate of 50 tons per week. At this rate it will require 20 weeks to restore the output capacity to that of a year ago.

The highest price for zinc ore, which has rested several weeks at $40, was increased in one instance to at least $42.50 per ton. The lot of ore selling at this price was purchased on a basis of $38 per ton of 60 per cent zinc, and the ore assayed from a car sample 64.5 per cent zinc. The basis price, regulated by the distance of haulage, and the grade of the ore, ranges down to $36 per ton of 60 per cent zinc. The assay basis has been generally advanced $1 over a week ago.

Lead ore receded $3.50 per ton during the week, the market closing steady at $50.50 per ton. A year ago the highest price for lead was $45.50, and for zinc $35 per ton.

Following are the sales of zinc and lead from the various camps of the Joplin District the week ending to-day:

	Zinc ore, lbs.	Lead ore, lbs.	Total Value.
Joplin	2,654,620	298,970	$56,733
Webb City-Carterville	1,747,200	321,740	39,655
Wentworth	1,166,000	.....	22,737
Galena-Empire	813,550	102,490	16,822
Duenweg	739,510	83,360	16,177
Aurora	601,000	6,280	9,225
Oronogo	416,670	900	7,503
Alba-Neck	332,780	44,570	7,459
Prosperity	304,020	14,550	6,123
Granby	334,000	37,000	4,750
Carthage	195,780	.....	3,720
Zincite	146,200	3,520	2,868
Central City	163,240	1,190	2,643
Spurgeon-Spring City	104,910	47,680	2,265
Cave Springs	80,180	22,650	1,890
Springfield	.....	44,000	1,144
Mitchell	54,480	.....	1,025
Diamond	58,350	.....	950
Total sales	9,997,200	1,028,900	$205,341
25 weeks	235,140,280	27,626,440	$4,754,356

Zinc value for week, $179,324; 25 weeks, $4,002,474. Lead value for week, $26,017; 25 weeks, $751,782.

Compared with the previous week the shipment was an increase of 508 tons of zinc, a decrease of 135 tons of lead, but an increase in value of $12,050. Compared with the same week of last year the shipment was 74 tons of zinc and 31 tons of lead more, and the value was $26,528 greater. A comparison of the 25 weeks of the year shows a decrease of 13,190 tons of zinc and 1,751 tons of lead, but the higher prices of this year have resulted in an increase of $371,953 in value.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	28.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	....	29.36	....	4.075	....	4.96
July	....	28.38	....	4.075	....	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.38
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Average Prices of Copper.

Month.	New York Electrolytic. 1903.	New York Electrolytic. 1902.	New York Lake. 1903.	New York Lake. 1902.	London Standard. 1903.	London Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	.....	12.110	.....	12.360	....	53.33
July	.....	11.771	.....	11.923	....	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.08
December	.....	11.430	.....	11.599	....	50.95
Year	.....	11.626	.....	11.887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London. Pence.	1903. N. Y. Cents.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.
January	21.98	47.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.63
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	....	....	24.17	52.36	27.42	59.57
July	....	....	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.08	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
†Am. S. & Ref., pf.	July 7	1.75	$875,000	$11,516,553
†Central Coal & Coke com.	July 15	1.50	76,875	474,375
†Central Coal & Coke, pf.	July 15	1.25	23,437	773,435
§Maryland Coal, pfd.	July 1	2.50	47,125	951,885
Maryland Coal, pf., extra	July 1	1.00	18,850	.....
New Idria Quicks, Cal.	July 1	.30	30,000	490,000
†Republic Iron & St., pf.,	July 1	1.75	356,246	5,693,032
Silver Hill, Nev.	June 22	.05	9,000	28,800
†Sloss-Sheffield S. & L.,pf.	July 1	1.75	114,000	1,596,000
*Trinity County, Cal.	July 1	.05	5,000	35,000
†Va.-Car. Chem., pf.	July 15	2.00	240,000	6,780,000

* Monthly. † Quarterly. § Semi-annual.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Alpha Con.	Nev.	27	June 30	July 21	.05
Best & Belcher	Nev.	..	July 17	Aug. 7	.15
California	Utah	..	July 9	July 25	.001½
Caledonia	Nev.	54	July 8	July 24	.15
Challenge Con.	Nev.	36	June 23	July 14	.05
Chilar Con. Mex.	Mex.	..	July 17	.....	.01
Con. New York	Nev.	18	July 15	Aug. 5	10
Eureka Con. Drift	Cal.	37	June 20	July 11	.00½
Esperanza	Cal.	..	July 13	.....	.01
Free Silver	Utah	..	July 10	Aug. 10	.00¼
Gambetta	Cal.	..	June 23	.....	.09
Golconda	Utah	5	June 27	July 17	.04¼
Jenny Lind	Cal.	17	June 20	July 6	.01½
Marina Marsicano	Cal.	..	Aug. 1	.....	.10
Mexican	Nev.	74	June 10	July 1	.10
Mountain Lake	Utah	..	June 8	July 6	.005
New York Bonanza	Utah	1	July 1	July 21	.03
Occidental	Nev.	42	June 18	July 9	.10
Reamer Con.	Cal.	..	July 13	.....	.10
Red Slide	Cal.	..	July 22	.....	.05
Scorpion	Nev.	..	June 15	July 17	.05
Silver Shield	Utah	5	June 19	July 7	.04
Sumdum	Alaska	..	July 13	.....	.05
Utah Con.	Nev.	..	July 17	Aug. 7	10
Ybarra	L. Cal.	..	July 13	.....	.10

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	June 17. H.	June 17. L.	June 18. H.	June 18. L.	June 19. H.	June 19. L.	June 20. H.	June 20. L.	June 22. H.	June 22. L.	June 23. H.	June 23. L.	Sales
Acacia, Colo	1									.08				1,000
Amalgamated c., Mont	100	55	53⅝	54½	53⅜	54⅜	53½	54¾	53⅜	54¼	53	54	53	62,365
†Anaconda c. Mont	25	89	80			87	87					85½	84	800
Anaconda Gold, Colo.	5											16		500
Best & Belcher, Nev.	3									51	50			
Brunswick, Cal.	1							.04		.04½				200
Bullion, Nev.	1									.06				1,000
Caledonia, Nev.	2⅛					1.50								100
Chollar, Nev	3	.25		.30										600
*Confidence, Nev.	1													
Con. Cal. & Va., g. s. Nev	2½	1.60	1.55			1.65	1.55	1.60	1.55	1.60	1.55			950
Cons. Imperial, Colo.	1					.08		.09						600
Cripple Creek c., Colo.	1													
El Paso, Colo.	1									.80				100
Elkton g., Colo.	1	.45	.44			.44				.45		.60		900
Golden Fleece, Colo.	1													
Greene Con., c., Mex.	10	21¼	20⅞	21½	20⅝	21	20⅞	21	20⅞	20¾	20	20⅜	19⅝	8,640
Hale & Norcross	3													
Homestake, S. Dak.	100													
Horn Silver, Utah	25			1.25						1.15				150
Isabella, g., Colo.	1	17										17		1,500
Justice, Nev.	1													
Leadville, Colo.	10									.04				300
Mexican, Nev.	3			1.25		1.20								200
Mollie Gibson, Colo.	5													
Moon-Anchor, Colo.	5											.08		500
Occidental, Nev.	1	.30		.24										500
Ophir, s., Nev	1	1.65				1.75		1.75		1.85				900
Overman, Nev.	1													
Pharmacist, Colo.	1					.03½								500
Portland, Colo	10			1.32						1.30				200
Potosi, Nev.	3	.32	.30	.30		.30								1,200
Savage, Nev.	2⅝					.24								200
Sierra Nevada, Nev	3													
Silver Hill, Nev	1	1.25		1.35	1.20									400
Small Hopes, Colo.	20											35	33	400
St. Louis														
Tenn. c., Tenn	25	29½	29⅛	29½	29¼	29⅜	29	29	29	28½	28½			900
Union Con., Nev.	2⅛			92	91									300
Union Cop., N. C.	10	1⅝	1⅝			1⅛	1⅛	1⅛	1⅛	1⅛	1⅛	1⅛	1¼	2,405
United Copper	100	18⅜	18	18⅜	18⅜	18⅛	18	18¼	18¼	18¼	18⅛	18½	18⅜	2,700
Vindicator, Colo.	1													
White Knob, g. s., Ida	100			14	14					12	12			200
Work, Colo	1													
Yellow Jacket, Nev.	3					.70	.65	.84		.85				1,030

Total sales 93,240 shares.

BOSTON, MASS.*

Name of Company.	par val	Shares listed.	June 17 § H.	June 17 § L.	June 18. H.	June 18. L.	June 19. H.	June 19. L.	June 20. H.	June 20. L.	June 22. H.	June 22. L.	June 23. H.	June 23. L.	Sales
Adventure Con., c.	$25	100,000			5⅜	5¼	5⅜	5⅛	5⅜	5	5⅜	5	5⅛		315
Allouez	25	99,511			6¼	6	6				6¼	6⅛	6		985
Amalgamated, c.	100	1,538,879			54⅛	53¼	54⅜	53⅛	54⅜	53⅜	54⅛	53¼	54	53	10,458
Am. Gold Dreding	5	90,000													
Am. Z. L. & Sm.	25	80,000													
Anaconda	25	1,200,000													
Arcadian, c.	25	150,000			2⅜		2¾	2⅜	2⅞		2⅞	2½	2¾	2⅜	645
Arnold	25	80,000													
Atlantic, c.	25	100,000			10⅝		9⅝		10¼	9⅜					675
Bingham Con. g. s.	50	150,000					28⅜	27½	28⅜	28	27⅜	28	27½		1,820
Bonanza	10	300,000													
Cal. & Hecla, c.	25	100,000			470	460	460				460	450	450		107
Centennial, c.	25	90,000			19½		20⅜	19	19¾	19⅝	20		19⅜	19	1,135
Central Oil	25	60,550			7¼		7¼		7¼		7¼				105
Con. Mercur, g.	5	1,000,000			1⅜				1½		1½	1¼			585
Copper Range Con.	100	285,000			53¼	52¼	54⅜	52	54¼	53	53	52½	53⅛	52⅜	5,537
Daly-West., g. s.	20	180,000			42	40½	42	41⅜	42	41¾	42	41⅜	42		1,172
Dominion Coal	100	150,000			91	89	91	88½	91	90	91	89½	93⅛	92½	3,101
Dominion Coal, pf.	100	30,000			114										100
Dominion I & S.	100	100,000			15⅜	13½	15¼	13½	15⅛	15	15	14	16⅜	14	4,515
Elm River	12	100,000			3										100
Franklin, c.	25	100,000			9								8¾		150
Granby	10	1,336,303					4⅜	4⅜	4⅛		4¼	4			610
Guanajuato, Con.	5	385,000			1⅜	1⅜	1⅜		1⅜		1⅜		1⅜	1⅜	1,200
Isle Royale Con., c.	25	385,000			8	7⅝	8				7		7⅜		750
Mass Con., c.	25	100,000			7½		7		7¼	6¾			7		520
Mayflower, c.	25	100,000			1⅛										100
†Michigan, c.	25	100,000			7½				8¼	8					160
Mohawk, c.	25	100,000			44⅜	44¼	44½	44	45		44⅜		44½	43¾	612
Mont. Coal & Coke	25	200,000													
Mont'l & Boston, c.	5	570,000			1⅜				1¼	1⅜	1¼		1¼		1,885
New Idria	5	100,000			9										50
Nova Scotia St. & C.	100				8.3¾	88¼	90⅛				91				210
Nova Scotia St. & C. pf	100														
Old Colony, c.	25	100,000					50				1		1		225
Old Dominion, c.	25	150,000			14	13⅜	13⅝	13¼	13¾				13⅜		585
Osceola, c.	25	96,150			55	54	57	54	57		56	55¼	55½	54	1,329
Parrot, s. c.	10	229,850			22		21		22¼		22⅛	21⅛	22		202
Phoenix Con., c.	25	100,000			4¾										100
Quincy, c.	25	100,000					100		103	101	103				22
Rhode Island, c.	25	100,000													
Santa Fe, g. c.	10	250,000			1¾				1⅞	1⅜			1¼		560
Shannon, c.	10	188,153			11⅞		12	11⅛	11⅛	11¼			11¾		1,070
Tamarack, c.	25	60,000					118		117	115⅛	117				129
Trimountain	25	100,000					89	87	87				87½	86½	240
Trinity, c.	25	160,000			6¾	5¾	6¼	6	6¾	6¾	6		6½	6	1,594
United Copper	100	450,000			18⅛	18¼					18⅜	18⅛			600
United States, g.	25	419,000			21¼	20⅜	23	20¼	22⅜	22	22⅛	21⅜	22	21¾	11,811
U. S. Coal & Oil	25	240,000			12	11½	12⅛	11⅛	12¾	12⅛					1,045
Utah Con., g.	5	300,000			29⅝	29	29¾	29	29¼		29	28½	28⅜	28	2,306
Victoria, c.	25	100,000			4¾	4¼			4¼		4¼	4			475
Winona, c.	25	100,000			9¼		9¼	8⅛			8¾	8⅝	8⅛		1,370
Wolverine, c.	25	60,000											65		140
Wyandot	25	100,000							1⅛						60

* Boston Stock Exchange. † Ex Dividend. ‡ Assessment Paid. § Holiday. Total sales, 61,272 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	June 12. H.	June 12. L.	June 13. H	June 13. L.	June 15. H.	June 15. L.	June 16. H	June 16. L.	June 17. H.	June 17. L.	June 18. H.	June 18. L.	Sales.
Central Eureka	Cal.	$1?0,000			.33										200
Colehan	Nev.	1,000,000	.28		.28		.29	.28			.28				800
Draper Gold Mfg. Co.	Cal.	500,000									.15				1,000
Esperanza	Nev.	1,000,000	.10	.09	.08				.08	.07	.08		.08		4,200
Gipsy Queen	Nev.	750,000	.27		.27						.26				1,000
Gold Mtn., Con	Nev.	750,000									.23	.22			400
Lucky Tom	Nev.	1,000,000			.14						.15	.14	.14		3,800
MacNamara	Nev.	500,000	.37	.35			.33	.29			.30	.27	.29		4,008
Mont-Tonopah	Nev.	1,000,000	1.15	1.12½	1.12½	1.10	1.07½						1.15		2,100
Paymaster	Nev.	750,000	.24	.23	.22				.23		.22	.21	.25	.22	8,800
Rescue	Nev.	500,000	.17		.16		.16	.15	.16	.15	.15		.16	.15	9,150
South Eureka	Cal.	300,000											.10		1,000
Tonopah-Belmont	Nev.	2,000,000			2.20	2.15	2.50	2.20	2.40	2.30	2.40	2.30	2.35		5,950
Tonopah Fraction	Nev.	750,000													
Tonopah Mfg. Co.	Nev.	1,000,000							8.75		8.00				150
Tonopah Midway	Nev.	1,000,000	.51	.45									.55	.51	2,650
Tonopah North Star	Nev.	750,000	.50						.50		.48	.46	.48		3,100
Tonopah Union	Nev.	750,000													
United Tonopah	Nev.		.16		.15										2,000
Utopia	Nev.	1,000,000	.46	.44	.46	.45	.52	.45	.55	.54					2,300

* San Francisco & Tonopah Mining Exchange. Total sales, 52,708 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val	June 17. H.	June 17. L.	June 18. H.	June 18. L.	June 19. H.	June 19. L.	June 20. H.	June 20. L.	June 22. H.	June 22. L.	June 23. H.	June 23. L.	Sales
Allis-Chalmers, U. S.	100					13½	13					13½	13⅛	300
Allis-Chalm's, pf, U.S.	100													
Am. Agr. Chem., U.S.	100													
Am. Agr. Chem. pf, U.S.	100													
Am. Sm. & Ref., U.S.	100	46	45¼	46	45¾	45⅝	45⅛	45¼	43	44	43½	44⅜	44	12,010
Am. Sm. & Ref. pf, U.S.	100	94	94	120¾	119	93¼	93	93¾	93	93	92⅜			1,890
Am. Steel & Fdy., U.S.	100											11	11	25
Am. S. & Fdy. pf., U.S.	100													
Col. Fuel & I., Colo.	100	64½	59	62	60	64	61⅛	63	62	62½	60	69¾	61½	62,485
Col. & H. C. & I., Colo.	100									17	17			100
†Crucible Steel, U. S.	100	15	14⅝	15	14⅜	15⅛	14⅜			15	15	15	14⅜	1,200
‡Crucible Steel, pf, U S	100	83½	80	80¾	80½	80¼	80			80¾	80¾	81	80⅜	513
†Mong. R. Coal, Pa.	100			10½	10⅜	10½	10⅛	10⅛	10⅛	10½	10½	10½	10½	1,950
†Mong. R. Coal pf, Pa	100	40¾	40½	40¾	40	40¾	40¼	40½	40¼	40⅜	40¾	40⅜		428
National Lead, U.S.	100	17⅛	17	17⅜	16¾	16½	16⅜							800
National Lead pf, U.S.	100			86¼	86⅛					85¼	85¼	85	85	200
†Phila Nat. Gas	100			41½	41½	41½	41½					42	42	80
†Phila Nat. Gas, pf	100													
†Pittsburg Coal, Pa.	100	26	26	27	27	27	27			27	27	27	27	2,780
†Pittsburg Coal pf, Pa	100	86⅞	86⅞	86⅞	86⅞	80¼	80	86⅜	86¼	86¼	86	86¼	86	1,558
Republic I & S., U.S.	100	15	14⅝	15	14⅜	15½	14¼			14⅜	14¾	14¾	14	2,780
Republic I. & S., pf, U.S.	100	74¼	74	74¼	74¼	74	73¼	74¼	74¼	74½	74	75	74¼	2,630
Sloss-Shef S. & I., Ala.	100	40	40	40	39¾	40¼	39¾	40	39¾	39¾	39½	40	40	2,210
Sloss-Shef S. & I. pf, Ala.	100	87¾	87⅜											200
Standard Oil, U.S.	100	650	645	645	642	642	642	650	642			641	641	110
Tenn. C. I. & R. R., Ala.	100	51¼	49½	50	49	50¼	48⅝	50½	49½	50	48¾	51¼	49¼	22,915
U. S. Red & Ref., U. S.	100													
U. S. Red & R. pf., U.S.	100													
U. S. Steel Corp., U.S.	100	30⅜	29⅞	30¼	28⅞	30	28⅜	29⅞	29¼	30⅛	29½	30¼	29⅜	159480
U. S. Steel Corp. pf, U.S.	100	80¾	79½	80	78⅛	80	78⅞	80¼	79¼	79⅞	79¼	80	79	85,330
Va.-Car Chem., U.S.	100			55	54½	54¼	54¼			54	53¾	53⅛	53	1,600
Va.-Car Chem. pf, U.S.	100											117¾	116¾	300
Va. I. C. & Coke, U. S.	100													

* New York Stock Exchange. † Pittsburg Stock Exchange. ‡ Ex-Dividend. Total sales, 363,214 shares.

COLORADO SPRINGS, COLO.*

Name of Company.	Par val	June 15. H.	June 15. L.	June 16. H.	June 16. L.	June 17. H.	June 17. L.	June 18. H.	June 18. L.	June 19. H.	June 19. L.	June 20. H.	June 20. L.	Sales
Acacia	$1	.08½	.08	.08⅜	.08	.08½	.08	.08½	.08	.08½	.08			500
Am. Con.	1	.03	.02½	.03	.02⅛	.03	.02⅜	.02⅝	.02⅛	.02⅝	.02¼			
Anaconda	1	.15		.15		14¾		.14		12¾	.12	.13		1,000
Ben Hur	1	.02		.02		.02		.02¼	.02	.02				
Blue Bell	1	.06	.05	.06	.05	.06	.05	.06	.05	.06	.05			
C. C. & M.	1	.02		.02		.02⅜	.02	.02		.02				
C. K. & N.	1	.20¾	.20	.20½	.20	.21	.20	.20⅜	.20⅛	.21⅛	.20¾	.21		13,000
C. C. Con.	1	.04		.05	.04	.05	.04¼	.05	.04¾	.04¾	.04⅜			6,000
Coriolanus	1	.03		.03		.03		.03		.03				
Des Moines	1	.03	.02½	.02¾	.02¼	.04	.02⅝	.03¾	.02⅝	.02¼				
Dr. Jack Pot	1	.09		.09		.09		.09		.09				1,100
Elkton Con.	1	.41⅝	.40¾	.41⅝	.40½	.42	.41	.42¼	.41	.42¼	.41			2,400
El Paso	1	.62	.60	.61½	.60	.61½	.60	.60½	.60⅛	.60½	.60¼	.60½	.60	5,233
Fannie Rawlings	1	.03		.03¾		.04	.03	.04	.03	.03¾	.03			
Findley	1	.14	.13½	.14⅜	.13¾	.15	.13½	.15	.13¾	.14	.13⅝			8,000
Gold King	1													
Gold Dollar Con.	1	.05¼	.05	.05¼	.05½	.05¼	.05	.05¼	.05	.05¼	.05			3,000
Golden Cycle	1	.71½	.71	.72	.70⅝	.72	.71	.70	.69	.70	.69	.70		8,600
Golden Fleece	1	.12		.12		.11		.12		.12				
Gould	1	.03¼		.03½		.04		.03½		.03¾				
Hart	1	.05	.02½			.05	.02	.02¾		.05	.02¾			
Isabella	1	.15¾	.15½	.15¼	.15	.15¾	.14¾	.15⅝	.15¼	.15½	.15	.15		12,000
Jack Pot	1	.09	.08	.09		.09		.09		.09				1,000
Last Dollar	1	.60		.60		.60		.60		.60				
Lexington	1	.03½		.03½		.04	.03½	.04½	.03½	.04¼	.03⅜			2,000
Little Puck	1	.03	.02½	.03	.02	.03	.02	.02¾	.02	.03	.02			
Mollie Gibson	1	.06	.05⅜	.06¼	.05¾	.06⅜	.05½	.05½		.06⅜	.05½			
Moon Anchor	1	.09		.09		.09		.09	.07	.09	.07⅜			
New Haven	1	.03	.02⅜	.03¼	.02⅜	.03	.02⅜	.03	.02⅜	.03	.02⅜	.03	.02⅜	2,000
Pharmacist	1	.04¼	.03¾	.03¾		.05	.04	.04¼	.04	.04¼	.03⅜			
Pinnacle	1	.04¼		.04¼		.04¾		.04¾		.04¼				
Pointer	1			.01¾	.009	.01½	.01	.01¼		.01				2,000
Portland	1	1.36	1.28	1.36	1.28¼	1.30	1.27	1.30	1.25	1.27	1.25	1.23		6,300
Prince Albert	1	.03	.02½	.03	.02	.03	.02	.03	.02	.03	.02			
Vindicator	1	.90	.87½	.92		.92	.75	.92		.92				500
Work	1	.06¾	.06¼	.05¾	.05¾	.05⅞	.05¼	.06	.05¼	.06	.05⅛	.05½		4,000

*Colo. Springs Mining Stock Exchange. † Holiday. All mines are in Colorado. Total sales 78,633 shares.

COLORADO SPRINGS. (*By Telegraph.*)

Name of Company.	June 15. H.	June 15. L.	June 16. H.	June 16. L.
Acacia	.08	.07½	.08¾	.08
Am. Con.	.02½	.02	.02½	.02
Anaconda	.14	.12	.13¾	.12½
Blue Bell	.06	.05	.06	.05
Cripple Creek Con.	.04¾	.04⅛	.04⅛	.04¼
C. K. & N.	.22	.21	.21	.20
Doctor Jack Pot	.09	.08	.09	.08
Elkton, Con.	.42½	.41	.43	.41
El Paso	.60⅝	.60	.60¾	.60
Findley	.14	.13	.14	.12½
Gold Dollar Con	.05¼	.05	.05½	.05
Golden Cycle	.71⅜	.66	.71	.68½
Golden Fleece	.12	.05	.12	.05
Gould	.02¼	1.02	.03¾	.03

Name of Company.	June 15. H.	June 15. L.	June 16. H.	June 16. L.
Isabella	15¼	.14	.15½	.14½
Jack Pot	.09	.08	.10	.08
Keystone	.05	.04¾	.04¾	.04⅜
Last Dollar	.52	.48	.51	.49
Lexington	.04¼	.04	.04	.03⅝
Little Puck	.03	.02¾	.02¾	.02¼
Mollie Gibson	.06	.05¾	.06	.05¼
Moon Anchor	.08¼	.07	.08¼	.08
Old Gold	.06⅝	.06¼	.06⅝	.06⅛
Pharmacist	.04¼	.04	.04½	.03⅞
Pinnacle	.04¼	.03¾	.04¼	.03⅝
Portland	1.36	1.23	1.26	1.23
Vindicator	.90	.80	.90	.80
Work	.06¾	.05⅜	.06	.05⅝

SAN FRANCISCO (*By Telegraph*)

Name of Company.	June. 22.	June. 23.
Belcher	.50	.50
Best & Belcher	2.20	2.15
Caledonia	1.30	1.30
Challenge Con.	.60	.64
Chollar	.27	.28
Confidence	1.50	1.50
Con. Cal. & Va.	1.60	1.60
Con. Imperial	.07	.07
Crown Point	.30	.30
Gould & Curry	.42	.42
Hale & Norcross	.64	.66

Name of Company.	June. 22.	June. 23.
Justice	.12	.13
Mexican	1.25	1.25
Occidental Con.	.36	.35
Ophir	1.70	1.70
Overman	.41	.40
Potosi	.31	.31
Savage	.22	.21
Sierra Nevada	.78	.78
Union Con.	.96	1.00
Utah Con.	.30	.30
Yellow Jacket	.81	.82

STOCK QUOTATIONS

MEXICO*. June 12.

Name of Company	Share Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango.				
Ca. Min. de Penoles...	2,500	$50.00	$4,000	$4,500
San Andres de la Sierra	200		10,000	
Guanajuato.				
Angustias, Pozos	2,400	5.00	70	73
Cinco Senores y An., aviadoras	2,000	15.00	185	195
Cinco Senores y An., aviada	400	10.00	160	170
Providencia, San Juan de la Luz	6,000	2.00	118	128
Queensland y Australia	300		90	100
Guerrero.				
Delfina, 1st serie	2,500		45	40
Delfina, 2d serie	2,500		30	29
Garduno y Anexas	7,200		45	60
Hidalgo.				
Amistad y Concordia	9,600	6.90	79	81
Carmen, aviada	1,100		140	150
Guadalupe Fresnillo Mill	1,000		250	300
Guadalupe Fresnillo Mine	1,400		70	80
La Blanca, aviadora	1,536		1,000	1,100
La Blanca, aviada	768			
La Reina y An., aviadora	5,600		22	25
Luz de Maravillas, aviadas	1,100		20	
Maravillas y An., aviador	1,680		90	
Maravillas el Lobo	1,000		130	180
Palma y An., aviador	1,800			12
Real del Monte	2,554	10.00		
Refugio, avadia	12,830		7	5
Santa Ana y An., aviadora	1,800		30	40
Santa Ana y An., aviada	600		25	30
Sta. Gertrudis y An., aviadas	9,600			7
Sta. Gertrudis y An., aviadora	28,800	1.00	87½	90
Santo Tomas Apostol aviadoras	5,100		3	6
San Felipe de Jesus, aviadora	3,600		18	20
San Felipe de Jesus, aviada	1,200			10
San Rafael y An., Trompillo	1,200	12.00	1,115	1,130
San Rafael y An., aviada	1,200	4.00	385	395
Soledad, aviada	960	0 .00	370	380
Sorpresa, aviada	960	5.00	318	320

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico.				
Alacran	$2,400		75	85
Aldebarran			85	90
Buen Despacho	3,000		82	84
Dos Estrellas	3,000	30.00	2,400	2,415
La Esperanza (El Oro)	3,000	10.00	1,300	1,330
La Reformia, aviadores	2,000		80	90
Providencia, pagadoras	1,600			
Providencia, liberadas	900			
Santa Ana, Esperanza	2,400		70	90
Michoacan.				
Luz de Borda, aviadora	3,000		90	95
Luz de Borda, aviada	1,000		23	26
Nerevo Leon:				
La Fraternal	1,000		600	550
Norias de Bajan	1,000		600	550
Santiago y An., Tlal.	4,000			
San Luis Potosi.				
Concepcion y An.	3,000		105	124
El Barreno, aviadora	2,000	2.00	50	54
Sta. Maria de la Paz	2,400	20.00	670	680
San Diego y Annexas	2,400	4.00	25	28
Zacatecas.				
Asturiana y An.	2,500		75	85
Candelaria y Pinos	2,500	10.00	290	300
Cubiertas	2,400			
Esperanza y An.	2,400		58	65
Lourdes	2,500		50	60
Luz de Minillas, pagadoras	2,000		10	20
Nueva Quebradilla, aviadoras	2,400		42	35
Nueva Quebradilla, avaidas	600		45	40
San Carlos y Annexas	2,500	20.00	160	175
Sta. Maria de Gaud.	2,500	10.00	65	75
Miscellaneous.				
Bartolome de Medina	2,000	1.50	70	75
Guadalupe Hacienda	10,000	6.00		
La Luz Hac. (Pachuca)	3,750		280	290
La Reina (Chihuahua)	192			
Naica (Chihuahua)	100		11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,100
Natividad (Oaxaca) aviadas	600	4.00	1,000	1,100
San Francisco Hac.	6,000	1.00	53	58
Santa Ana Huantla Morelos	4,000			
Union Hacienda	3,000	5.00	225	240

*Values are in Mexican currency.

SALT LAKE CITY.* June 20.

Name of Company	Shares.	Par Val	High	Low	Sales.
Ajax	300,000	$10	.25	.25	3,700
Ben Butler	500,000	1	.13	.10	5,827
California	300,000	1	.17½	.13¼	10,300
Carisa	500,000	1	.11	.08	2,000
Con. Mercur	1,000,000	5	1.42	1.29	2,000
Comstock			1.06	1.00	300
Daly					
Daly-Judge	300,000	1	10.90	10.75	166
Daly-West	300,000	20	43.50	40 50	920
Grand Central	250,000	1			
L. Mammoth	150,000	1	1.00¾	.91½	27,900
M. Washington	300,000		.03	.02¾	10,000
Mammoth	400,000	25			

Name of Company.	Shares.	Par Val	High	Low	Sales.
Majestic Cop					
May Day	400,000	0.25	.22¼	.19¾	13,900
N. Y. Bonanza			.23	.22½	1,100
Petro					
Sacramento	1,000,000	5	.25	.24½	15,500
Silver Shield					
South Swansea	300,000	1	.17½	.16¾	3,900
Star Con	500,000	1	.29½	.27¾	16,350
Uncle Sam	500,000	1	.25½	.25	2,100
Utah	100,000	10	.64	.62½	3,200
Victor	500,000	1	.19	.17¾	1,528
Wabash			.21¾	.20½	2,800
Yankee Con	500,000	1	.37¼	.37	500

All mines are in Utah. *By our Special Correspondent. Total sales, 123,985 shares.

ST. LOUIS, MO. June 20.

Name.	Capital Stock	Par val.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo	$3,000,000	$10	$0.45	$0.70
Catherine Lead, Mo.	500,000	10	1.50	3.00
Central Coal & C.	1,875,000	100	62.00	63.00
Central C. & C., pf.	1,875,000	100	73.50	74.00
Central Lead, Mo.	1,000,000	10	120.00	130.00

Name.	Capital Stock.	Par val.	Prices. Bid.	Prices. Ask.
Columbia Lead, Mo.	$500,000	10	$12.00	13.00
Con. Coal, Ill.	500,000	100	22.50	23.00
Doe Run Lead Co.	1,500,000	100	107.50	110.00
Granite Bimet. Mt.	1,000,000	10	60	65
St. Joe Lead, Mo.	6,000,000	10	16.00	17.00

* From Our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Company.	par val	June 17. H.	June 17. L.	June 18. H.	June 18. L.	June 19. H.	June 19. L.	June 20. H.	June 20. L.	June 22. H.	June 22. L.	June 23. H.	June 23. L.	Sales
Am. Alkali, Mich	$50													
Am. Cement	10	88	88	8	8			7⅜	7⅜	7⅜	7¾	7⅜	7 11/16	608
Cambria Iron, Pa.	50	47	47					46½	46¼					38
Cambria Steel, Pa.	50	23½	23¼	23⅛	22¾	23	22⅝	23	22⅞	23	22⅞	23¼	22¾	4,907
Penn. Steel, pfd.	100													
Susq. I. & S., Pa.	5	1 13/16	1¾	1¾	1⅝	1⅝	1¾	1⅝	1⅝	1⅝	1 7/8	1 5/16	1¾	4,410
United Gas I., Pa.	50	90½	89¾	90¼	89	89¾	88¾	89¼	89	88¾	88½	89	88¼	2,464
Warwick I. & Steel	10											5	5	200

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 12,637 shares.

LONDON. June 12.

Name and Country of Company	Shares Issued.	Par value.	Latest dividend. Amt.	Latest dividend. Date	Quotations. Buyers.	Quotations. Sellers.
		£. s. d.	s. d.		£. s. d.	£. s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	3 0	Apr., 1903	4 12 6	4 17 6
Anaconda, c. s., Montana	1,200,000	5 0 0	2 0	May, 1903	4 10 0	4 12 6
Arizona, c., Def., ord	63,444	1 0 0	5 6	Feb., 1903	7 15 0	8 5 0
Arizona, pref., ord	316,350	1 0 0	5 6	Feb., 1903	8 0 0	8 5 0
Camp Bird, g., Colorado	738,000	1 0 0	0 7½	May, 1903	1 7 6	1 10 0
Central Chile, c., Chile	276,248	1 0 0			3 0	4 0
Copiapo, c., Chile	112,500	2 0 0	8 10	May, 1903	1 17 6	2 2 6
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	10 0	12 6
El Oro, g., Mexico	1,000,000	1 0 0	1 6	Dec., 1902	1 13 9	1 16 3
Frontino & Bolivia, g., Colombia	128,662	1 0 0	3 0	July, 1901	13 9	16 3
Le Roi, g., British Col.	200,000	5 0 0	5 0	Nov., 1899	1 1 3	1 3 9
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	1 3 9	1 6 3
Mesquital, Mexico	250,000		2 0	Feb., 1903	2 6	3 6
Montana, g. s., Montana	657,128	1 0 0	6	April, 1899	1 6	2 0
Mountain, c., Cal.	250,000	5 0 0	4 0	Nov., 1902	3 2 6	3 7 6
Stratton's Independence, Colorado	1,000,007	1 0 0	6	April, 1902	7 6	8 0
St. John del Rey., g., Brazil	546,265	1 0 0	8	June, 1903	15 0	16 3
Utah Con., g. c., (Highland Boy), Utah	300,000	1 0 0	7 0	Jan., 1903	5 10 0	6 0 0
Ymir, g., British Col.	200,000	1 0 0	1 0	Mar., 1902	7 6	12 6
European:						
Linares, l., Spain	15,000	3 0 0	9	Oct., 1902	2 15 0	3 5 0
Mason & Barry, c., sul., Port'g'l	185,172	1 0 0	11 0	May, 1903	3 10 0	3 15 0
Rio Tinto, c., Spain	325,000	5 0 0	27 6	Apr., 1903	47 0 0	47 5 0
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	Apr., 1903	6 0 0	6 5 0
Tharsis, c., Spain	625,000	2 0 0	6 0	May, 1903	3 15 0	4 0 0
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	495,388	1 0 0	1 6	Jan., 1900	1 17 6	1 18 9
Briseis, Tin, Tasmania	600,000	1 0 0			4 6	5 6
Broken Hill Pr'p., s., N. S. Wales	960,000	8 0	1 0	Feb., 1903	1 9 6	1 10 6
*Cosmopolitan Prop., W. Australia	385,000	1 0 0	6	July, 1902	18 0	19 0
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Apr., 1903	9 3 9	9 6 3
Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Sept., 1902	7 12 6	7 15 0
Great Bo'd'r Pr'p., W. Australia	1,750,000	2 0	6	June, 1903	1 4 6	1 5 0
Ivanhoe Gold Corp. W. Australia	200,000	5 0 0	4 0	Jan., 1903	8 16 3	8 18 9
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	July, 1903	4 10 0	4 12 6
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	2 6 3	2 8 9
Mt. Lyell M. & R. L., c., Tasmania	275,000	3 0 0	1 0	Apr., 1903	2 18 9	3 1 3
*Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	May, 1903	3 5 0	3 10 6
Waihi, g., New Zealand	497,412	1 0 0	2 6	June, 1903	5 5 0	5 7 6
Indian:						
Champion Reef, g., Colar Fields	473,000	10 0	4 6	May., 1903	7 5 0	7 7 6
Mysore Gold, Colar Fields	530,000	10 0	5 0	Mar., 1903	7 3 9	7 6 3
Nundydroog, g., Colar Fields	484,000	10 0	1 6	Mar., 1903	2 11 3	2 13 9
Ooregum, g., Colar Fields	343,000	10 0	1 6	Apr., 1903	1 13 9	1 16 3
Ooregum, pref., g., Colar Fields	240,000	10 0	1 6	Apr., 1903	2 1 3	2 3 9
African:						
Angelo, g, Transvaal	600,000	1 0 0	6 0	Feb., 1903	6 17 6	7 2 6
Bonanza, g., Transvaal	200,000	1 0 0	12 0	Feb., 1903	3 17 6	4 0 0
British South Africa	4,436,019	1 0 0	rts.	May, 1899	2 15 0	2 16 3
Cape Copper, S. Africa	300,000	2 0 0	1 0	June, 1903	2 10 0	2 12 6
Cape Copper, pref., S. Africa	75,000	2 0 0	1 0	June, 1903	2 12 6	2 17 6
City and Sub'n (New), g., Transvaal	340,000	4 0 0	8 0	Aug., 1899	6 0 0	6 5 0
Crown Reef, g., Transvaal	120,000	1 0 0	11 0	May. 1903	16 10 0	17 0 0
De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	Mar., 1903	19 8 9	19 11 3
De Beers Con., def.	1,000,000	2 10 0	12 6	Mar., 1903	21 5 0	21 7 6
East Rand, Prop, Transvaal	970,000	1 0 0	5 0	June, 1903	7 3 9	7 6 3
Ferrcira g., Transvaal	90,000	1 0 0	2 0	May,. 1903	26 10 0	21 10 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	5 0	Feb., 1903	6 0 0	6 5 0
Geduld, g , Transvaal	400,000	1 0 0	rts.	Mar., 1902	6 7 6	6 10 0
Henry Nourse, g., Transvaal	125,000	1 0 0	8 0	Feb., 1903	8 17 6	9 2 6
Jagersfontein, d., Orange F. S.	200,000	5 0 0	6 0	Nov., 1899	29 17 6	30 2 6
Jubilee, g., Transvaal	50,000	1 0 0	5 0	June, 1903	5 0 0	5 5 0
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 12 6	3 17 6
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	3 17 6	4 0 0
May Con., g., Transvaal	288,750	1 0 0	3 0	Feb., 1903	4 0 0	4 5 0
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1903	5 7 6	5 12 6
Modderfontein, g., Transvaal	290,000	1 0 0	rts.	Apr., 1902	9 13 9	9 16 3
*Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1902	2 12 6	2 17 6
Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Feb., 1903	3 13 9	3 16 3
Rand Mines, g., S. Africa	1,795,956	5 0	4 0	June, 1902	10 1 3	10 2 6
Robinson, g., Transvaal	750,000	5 0 0	6 0	Feb., 1903	10 7 6	10 10 0
Robinson Deep, g., Transvaal	950,000	1 0 0	5 0	May, 1899	4 11 3	4 13 9
Rose Deep, Transvaal	425,000	1 0 0	2 0	Feb. 1903	8 7 6	8 12 6
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar., 1899	2 5 0	2 10 0
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1898	1 7 6	1 0 0
Village Main Reef, Transvaal	400,000	1 0 0	5 0	Oct., 1902	8 2 6	8 7 6
Wemmer, Transvaal	80,000	1 0 0	5 0	May, 1903	11 15 0	12 5 0

c.—Copper. d.—Diamonds. g.—Gold l.—Lead. s.—Silver. *Ex-Dividend.

LONDON. (*By Cable*).*

Name of Company.	June 16. £.	June 16. s.	June 16. d.	June 23. £.	June 23. s.	June 23. d.
Anaconda	4	7	6	4	5	0
British South Africa	2	15	0	2	15	0
Camp Bird	1	10	0	1	10	0
Con. Gold-Fields	6	12	6	6	18	9
De Beers Con. def.	21	8	9	19	17	6
East Rand	7	1	3	7	7	6
El Oro, Mex.	1	12	6	1	13	1½
Jagersfontein	30	0	0	30	0	0

Name of Company	June 16. £.	June 16. s.	June 16. d.	June 23. £.	June 23. s.	June 23. d.
Johannesburg Invest.	2	18	9	3	0	0
Modderfontein	9	15	0	9	18	9
Rand Mines	9	18	9	10	2	6
Rio Tinto com	46	12	6	46	5	0
Simmer & Jack	1	8	1½	1	9	4½
Tomboy	1	11	10½	1	16	3

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. June 11.

Name of Company.	Country.	Product.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Closing
			Francs.	Fr.	Fr.	Fr.	Fr.
Boleo	Lower Cal.	Copper		500	176.00	1,405.00	1,368.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	20.75	18.50
Fraser River	Brit. Col'mb.	Gold	250,000	25		6.50	6.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	95.25	93.75
Laurium	Greece	Zinc, Lead	16,300,000	500	25.00	354.00	342.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	485.00	480.50
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	480.00	462.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1		8.00	7.75
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	659.00	647.00

TORONTO, ONT.* June 20.

Name of Company.	par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.05	.02¼	
Cariboo (Mc. K.)	1	.14	.10	
Cariboo (Hyd.)	1	.75		
Center Star	1	.30	.27	
Crows Nest, C.	100	380	300	
Dominion Coal, com.	100	.92¼	87	
Dominion S. & I.	100	.16	12	
Dominion S. & I., pref.	100			
Fairview	1	.03½	.05¼	
Giant	1	.04½	.02	2,000

Name of Company	Par val	Prices. High.	Prices. Low.	Sales.
Granby Smelter	$10	500	480	25
Mountain Lion	1	.28	.20	
North Star	1	.14	.10	
Nova Scotia Steel, com	100	.90	.82	
Payne	1	.18	.12½	
Rambler Cariboo	1	.40	.38	
Republic	1	.06	.03	
St. Eugene	1	.45	.35	
Virtue	1	.08	.06	
War Eagle Con.	1	.15	.11	4,000

*Standard Stock and Mining Exchange. Total sales 6,025 shares

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHCLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F.FF.FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09½
Mont. car-lots, f.o.b., Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg.ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh.ton		25.00@35.00
Pumice Stone, Am. Powd	lb.		.01¾@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg.	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.39@2.40
Refined wood 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		.95
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.05½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05⅝
Lump	"		.09
Nitrate, white pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¼
Oxide, com'l white, 95%	"		.09¼
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.03@.03¼
Red	"		.06½@.06¾
ASPHALTUM—			
Ventura, Cal.	sh.ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh.ton		25.00@27.50
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05⅞
BARIUM	Cust.	Meas.	Price
Sulphate (Blanc Fixe)	lb.		$0.01⅞
BARYTES—			
Am. Crude, No. 1	sh.ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign, gray	"		13.50
Snow white	"		17.00
Floated	"		19.00
BAUXITE—Ga. or Ala. Mines:			
First Grade	lg.ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk.	"		.40@.48
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh.ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		2.00@2.15
Foreign	"		1.95@2.50
"Rosendale," 300 lbs	"		.80
Slag cement, imported	"		1.65
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh.ton		3.25
Ppt. per quality	lb.		.04¼@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE—			
(50% ch.) ex-ship N. Y.	lg.ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg.ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh.ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.50@2.65
Gray	"		2.52@2.75
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—in bulk	100 lbs.		.47½
In bbls	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25 lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro, (32-2-10° Be.)	"		.13¼@.13⅝
FELDSPAR—Ground	sh.ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg.ton		14.75
French, Best	"		11.75
FLUORSPAR—			
Am. lump, 1st grade	sh.ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH	100 lbs.		.80
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh.ton		$8.00
Pulverized	"		30.00
Am., pulverized other than R. I., f.o.b. N. Y.	"		45.00
Best flake	"		150.00
German, com. pulv.	lb.		.01¼@.01½
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¾
GYPSUM—Ground	sh.ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg.ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¾
True	"		.04
Oxide, pure copperas color.	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran.	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.75
Finishing	"		.95
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh.ton		17.50@18.00
Bricks best imp., f.o.b., N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		160.@200.
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—Powdered, 70@75% binoxide	lb.		.01¼@.01½
Crude pow'd. 75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic	"		.30
MARBLE—Flour	sh.ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh.ton		33.00@38.00
Fine	lb.		.00⅞@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in.	"		.80
3x4 in.	"		1.50
4x4 in.	"		2.00
6x6 in.	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh.ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.:			
25@30, cold test	gal.		.13@.13½
15, cold test	"		.13½@.14
Zero	"		.18@.18½
Summer	"		.12½@.13
Cylinder, dark steam ref.	"		.14½@.15
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.20
Extra cold test	"		.25@.31
Gasoline, 86°@90°	"		.16@.21
Naphtha, crude, 68°@72°	bbl.		11.20
"Stove"	gal.		.14½
Linseed, domestic raw	"		.39@.42
Boiled	"		.44
Calcutta, raw	"		.75
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05⅝@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06½@.08¼
PAINTS AND COLORS—	Cust.	Meas.	Price.
Metallic, brown	sh.ton		$19.00
Red	"		16.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04⅝
French, washed	"		.01½@.01⅞
Orange mineral, Am.	"		.08½@.08⅝
Foreign, as to make	"		.08½@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06½
Foreign	"		.06⅝@.08
Turpentine, spirits	gal.		.50@.50½
White lead, Am., dry	lb.		.05½@.05⅝
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex dry	"		.04⅝@.04¾
Foreign, red seal, dry	"		.06@.08½
Green seal, dry	"		.06½@.09½
POTASH			
Caustic, ordinary	"		.04½@.04⅞
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am.	"		.08¼@.08¼
Scotch	"		.08½@.09
Bromide	"		.25@.38
Carbonate (80@85%)	"		.03½@.04⅝
Chlorate, powd.	"		.07¼@.07⅝
Crystals	"		.07@.07½
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg.ton		9.30
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09¼@.09⅝
Prussiate, yellow	"		.13¼@.13½
Red	"		.34
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh.ton		4.40
SALTPETRE—Crude	100 lbs.		3.20@3.35
Refined	"		4.00@4.50
SILICA—Best foreign	lg.ton		10.00@11.00
Ground quarts, ord.	sh.ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.33½
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ordinary, f.o.b. w'ks	100 lbs.		1.25
Extra domes. f.o.b. w'ks	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.75@.85
Foreign, f.o.b. N. Y.	"		.90@.92½
Caustic, 60@78%, f.o.b. w'ks	"		1.65@1.70
Foreign, f.o.b. N. Y.	"		1.90@2.00
Chlorate, com'l	"		.07¼@.07⅝
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.05
Shipments	"		1.95@2.00
Peroxide	lb.		.45
Phosphate	"		.02½@.02¼
Prussiate	"		.09¾
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.06
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh.ton		18.00
N. Y., Fibrous, best	"		10.25
French, best	100 lbs.		1.25
Italian, best	"		1.62½
TAR—Regular	bbl.		2.40
Oil barrels	"		4.40
TIN—Crystals	lb.		.22½@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¼
Carbonate, ppt.	"		.09
Chloride solution, com'l	"		.02¼
Chloride granular	"		.04¼@.04⅝
Dust	"		.04⅝@.04½
Sulphate	"		.02½@.02⅝

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BORON—Nitrate	lb.		$1.50
CALCIUM—Tungstate (Scheelite)	"		.60
CERIUM—Nitrate	"		10.00
DIDYMIUM—Nitrate	"		35.00
ERBIUM—Nitrate	"		40.00
GLUCINUM—Nitrate	"		20.00
LANTHANUM—Nitrate	"		30.00
LITHIUM—Carbonate	"		1.35
LITHIUM—Nitrate	oz.		.90
STRONTIUM—Nitrate	lb.		.07⅛@.08¼
THORIUM—Nitrate 49@50%	"		4.50
URANIUM—Nitrate	oz.		.25
YTTRIUM—Nitrate	lb.		40.00
ZIRCONIUM—Nitrate	"		8.00

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JUN 29 1903

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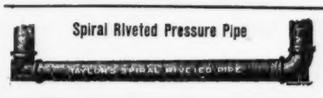

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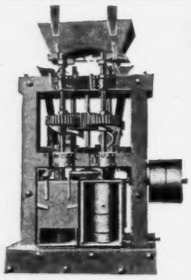

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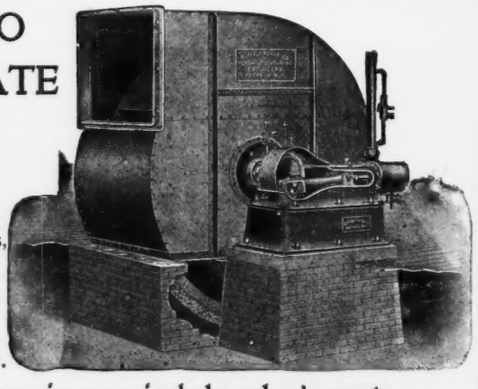

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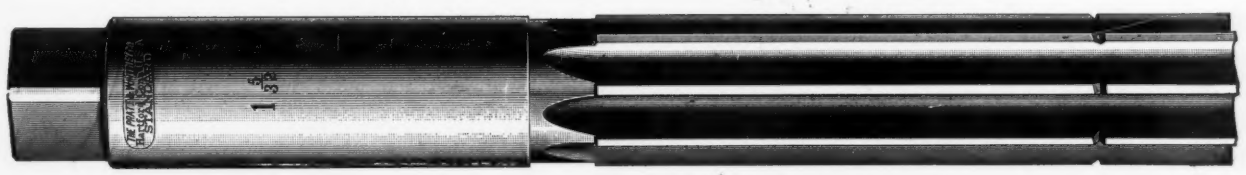

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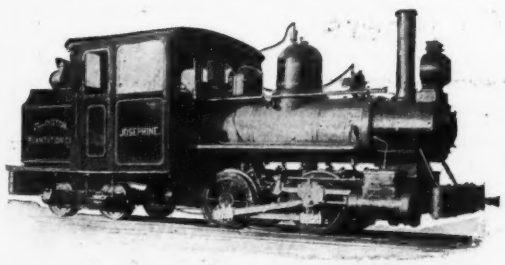

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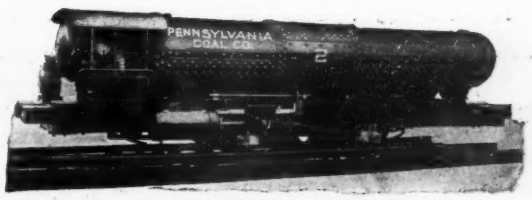

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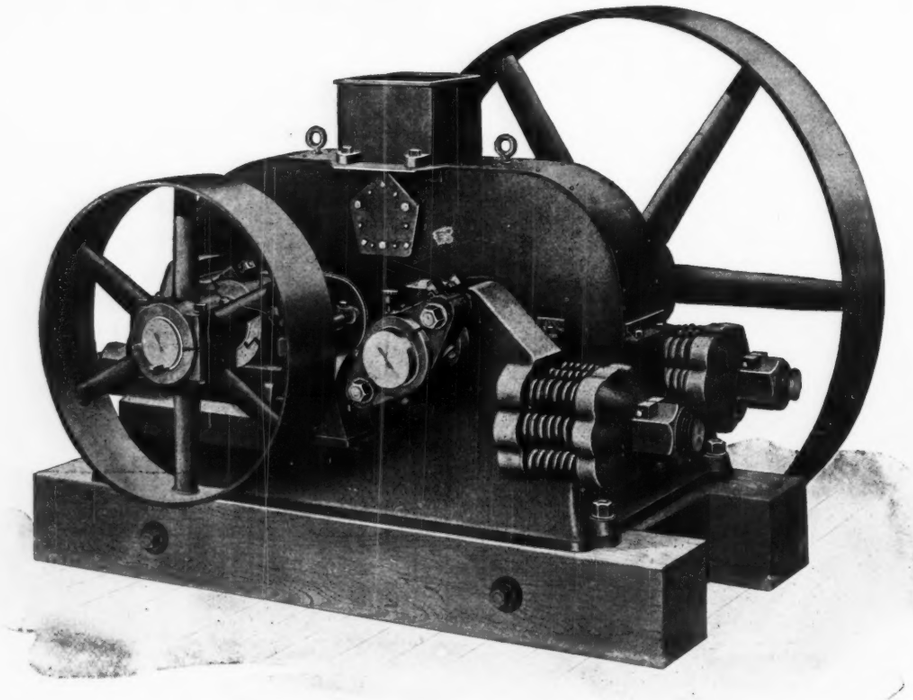

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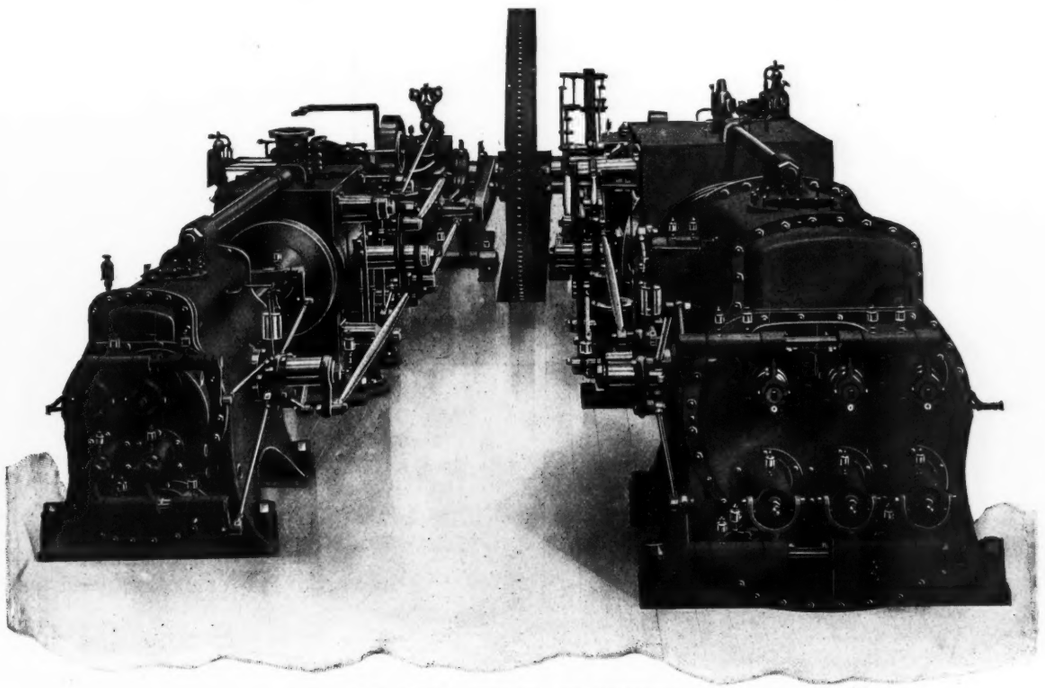

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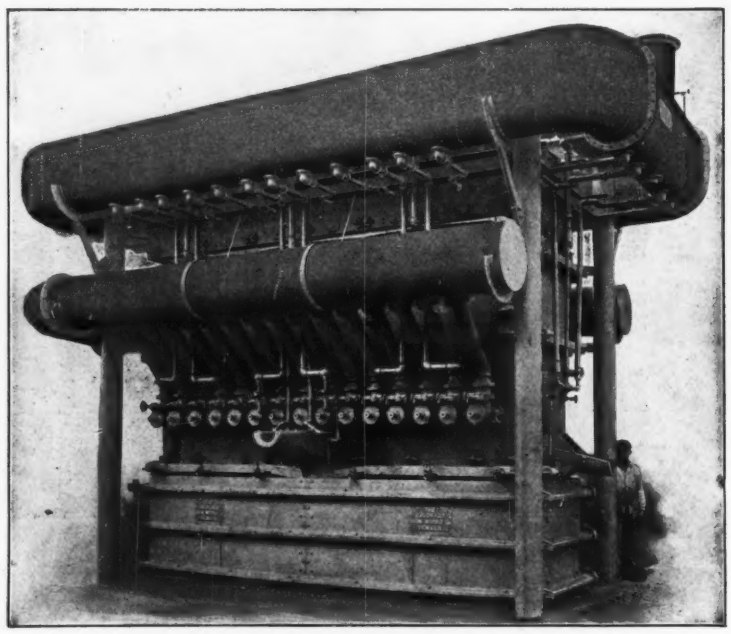

THE 1903 MODEL

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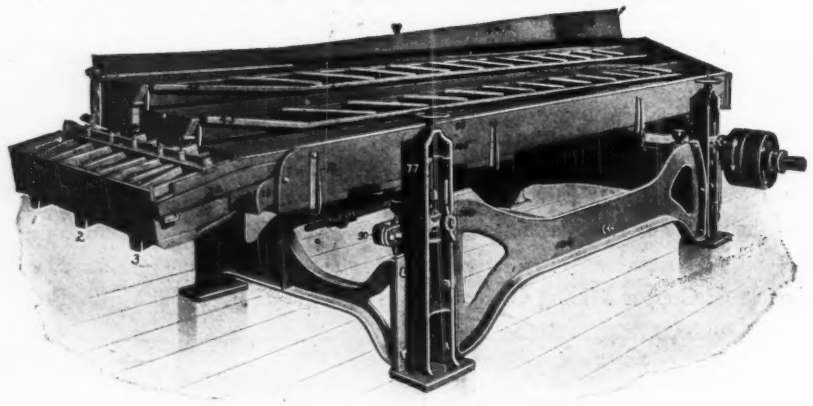

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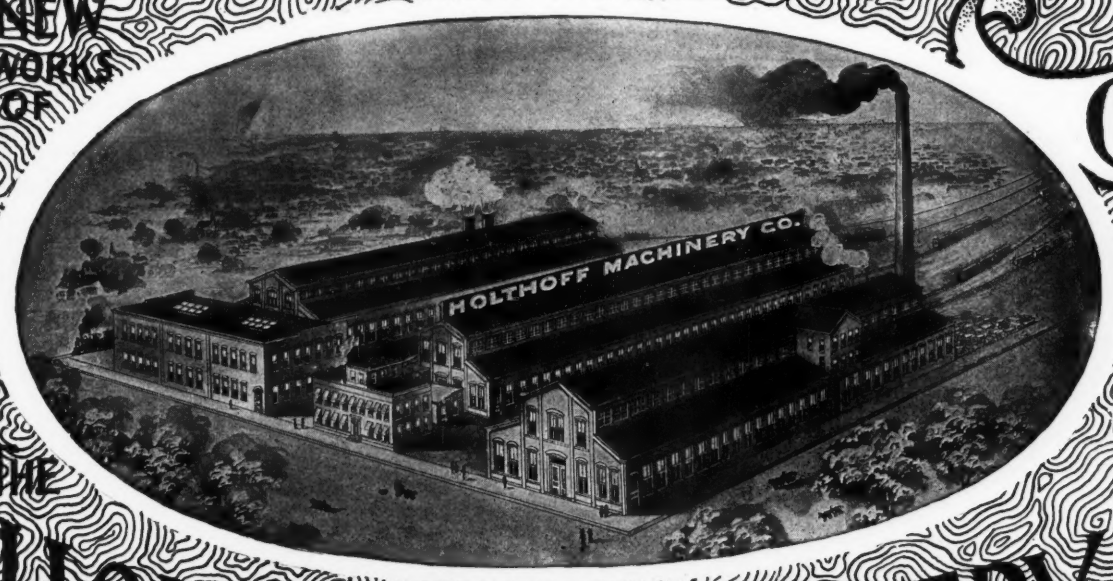

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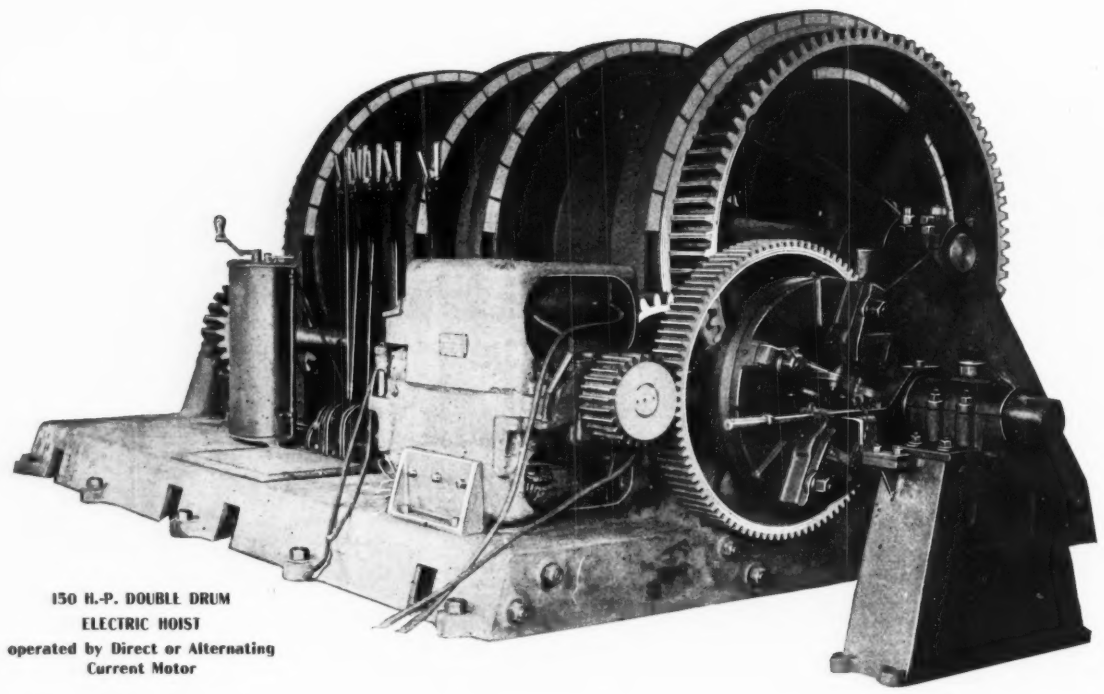

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Horse Power of Motor.	Type of Motor.	Revolutions per Minute of Motor.	Unbalanced Load Hoist will Raise in Lbs.	Rope Speed in Feet per Minute.	Dimensions of Drum.				Size of Rope Recommended.	Shipping Weight of Hoist With Motor, Lbs.
					Diameter.	Length.	Depth of Flange.	Length of Rope Drum will Hold, Feet.		
135	D. C.	700	4750	800	48″	34″	12″	8000	⅜″	41000
160	D. C.	650	5600	800	48″	34″	12″	8000	⅜″	43000
100	A. C.	600	4100	800	48″	34″	12″	8000	⅜″	47350
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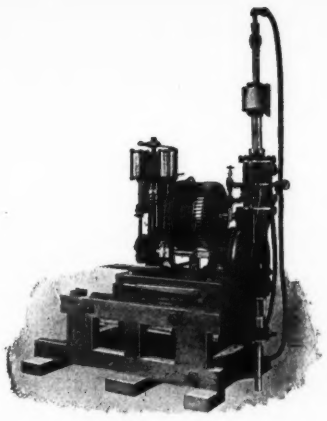

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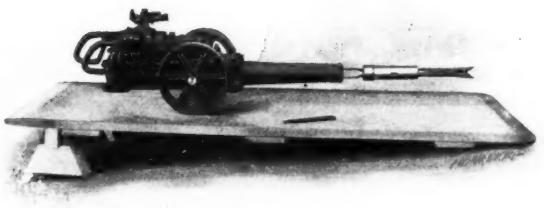

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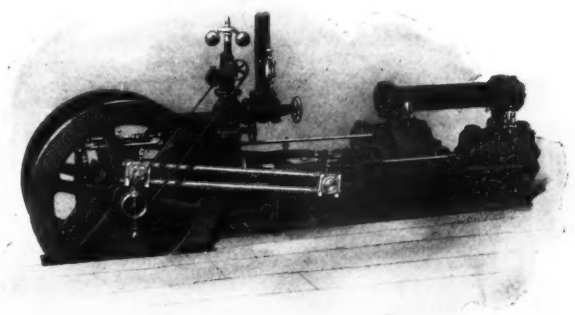

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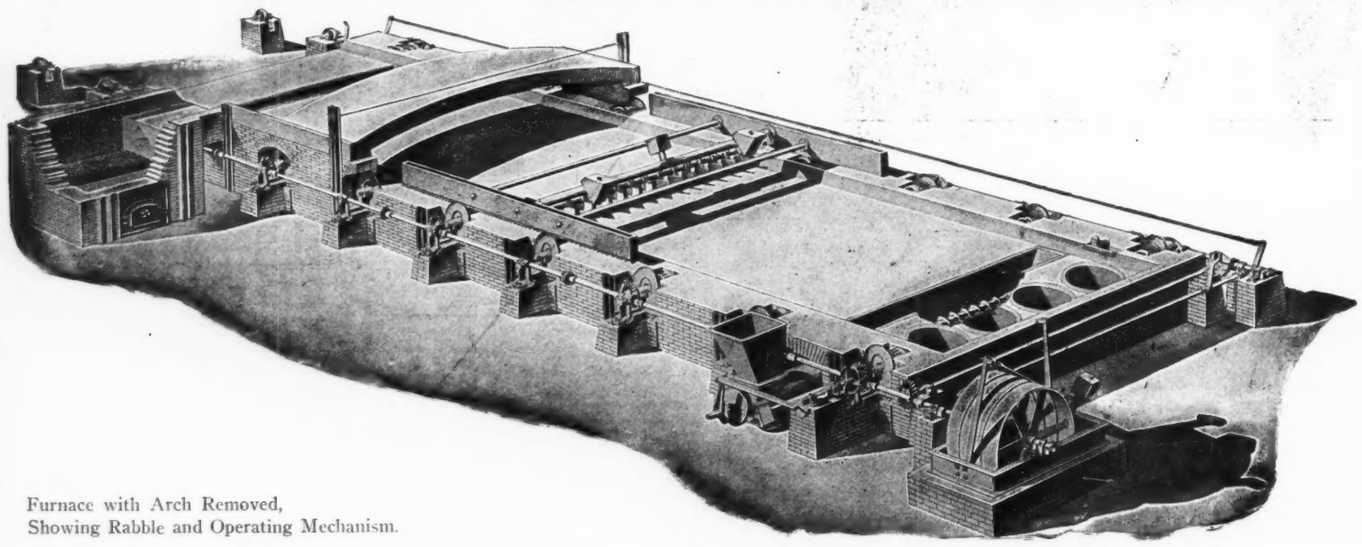

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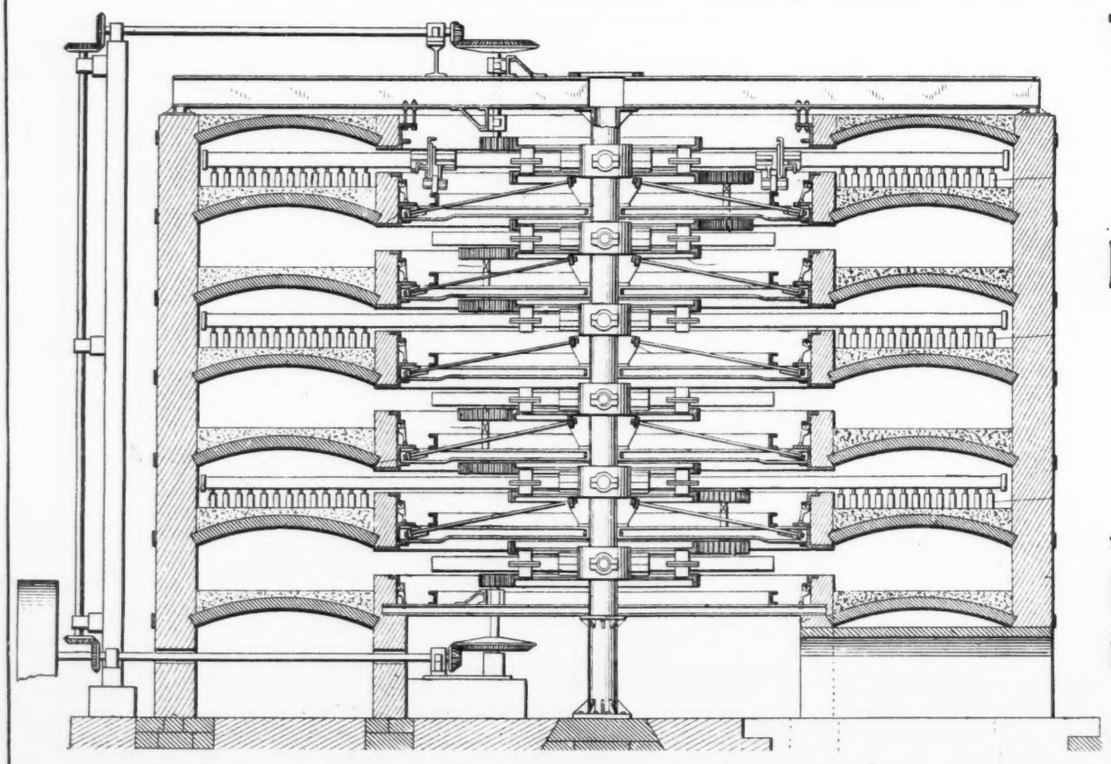

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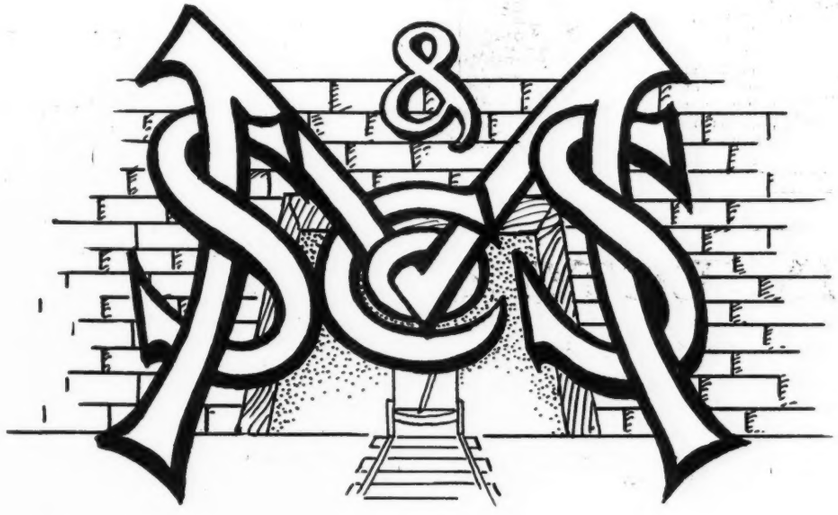

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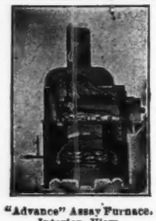

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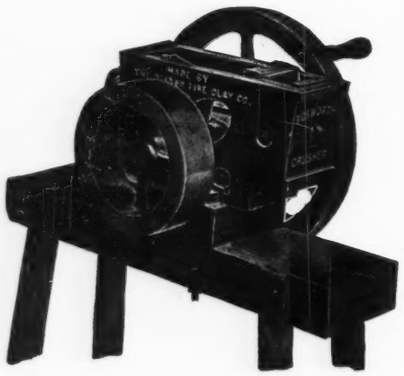

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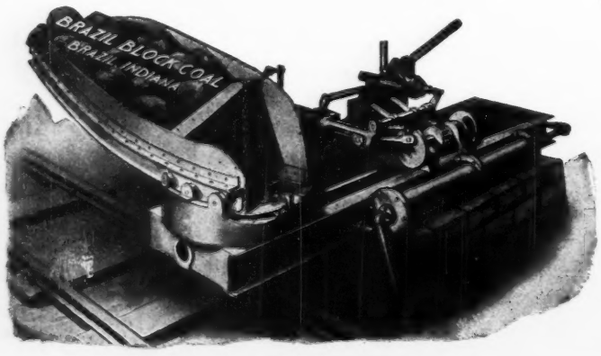

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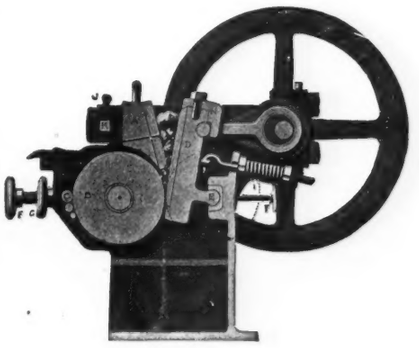

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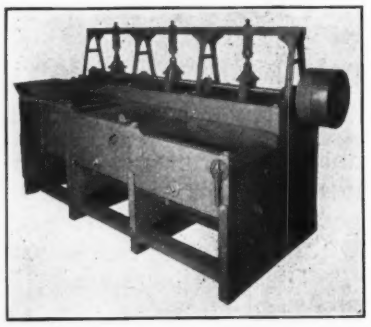

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Showing Cage equipped with Jelinek Chairs, illustrating how chairs drop automatically into shaft when cage is hoisted.

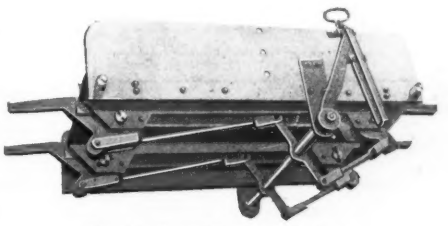
Can be Operated from the Cage

From any level without reaching into the Shaft

From the Collar of the Shaft

Or by a Lever on the Engineer's Stand

These chairs, when thrown out, form an extension of the track from the cage level to the shaft level. By the use of this device the cage can be landed upon any set of timbers where it may be found desirable to make repairs in the shaft



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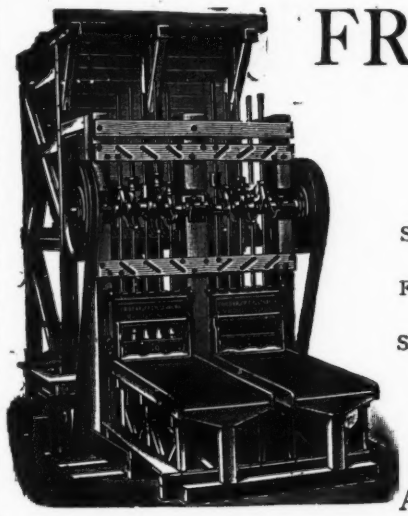

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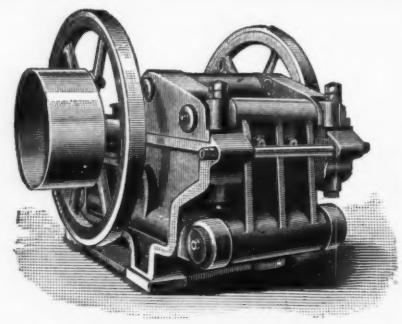

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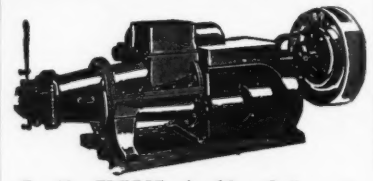

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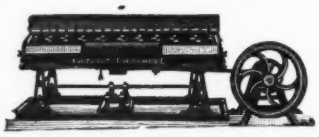

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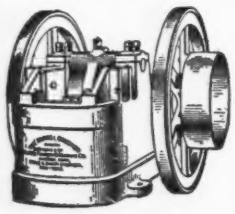

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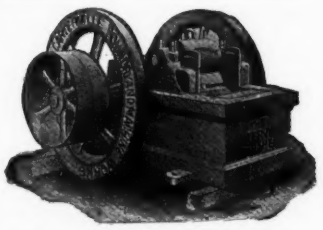

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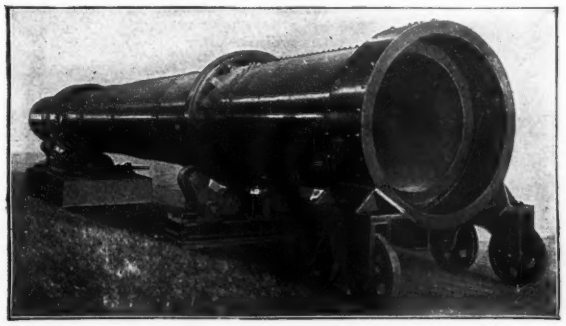

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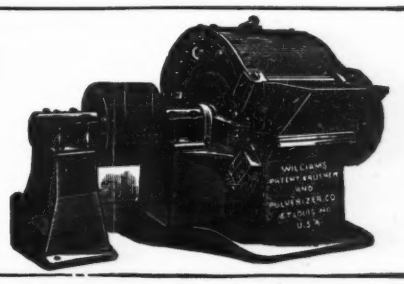

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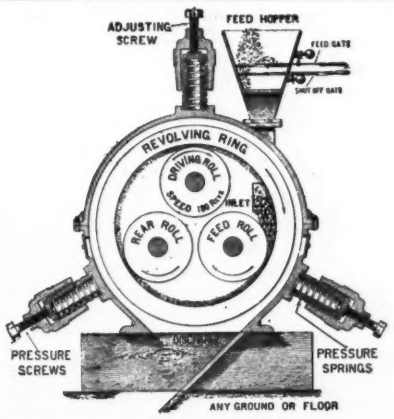

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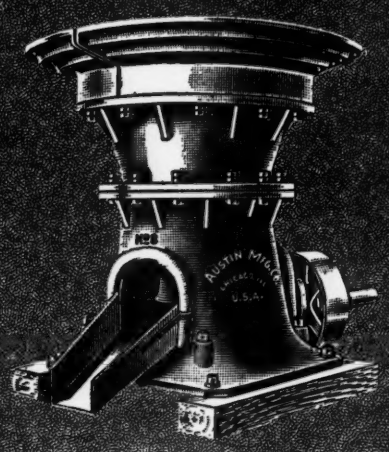

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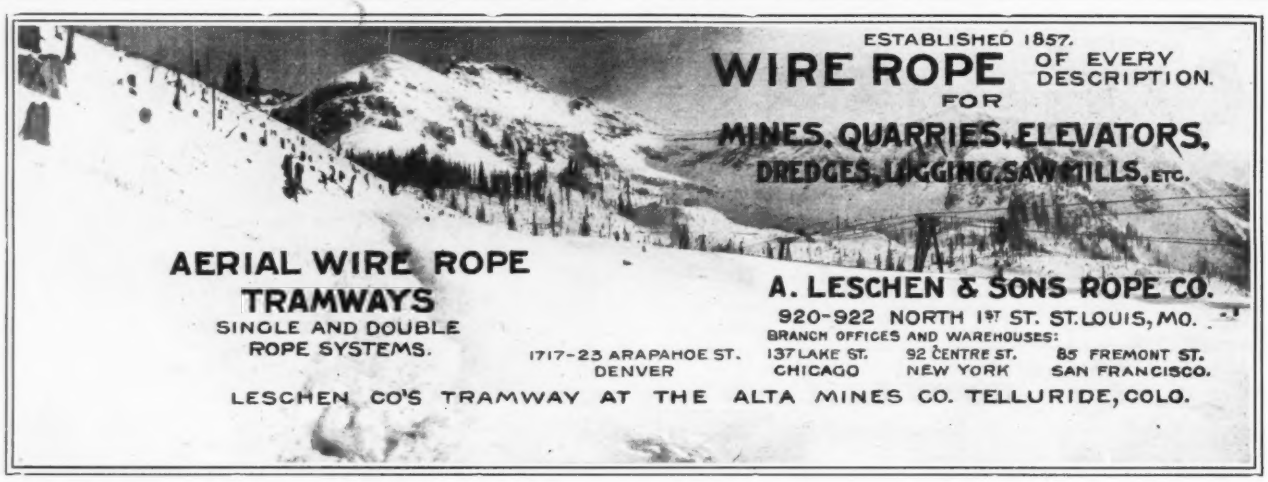

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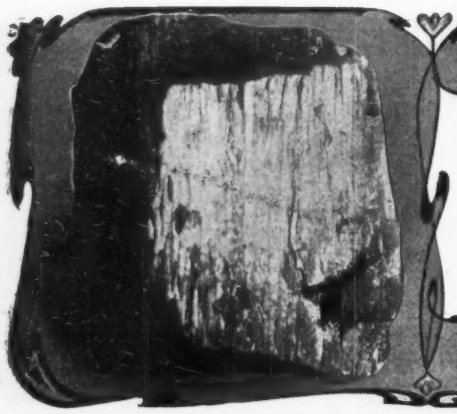

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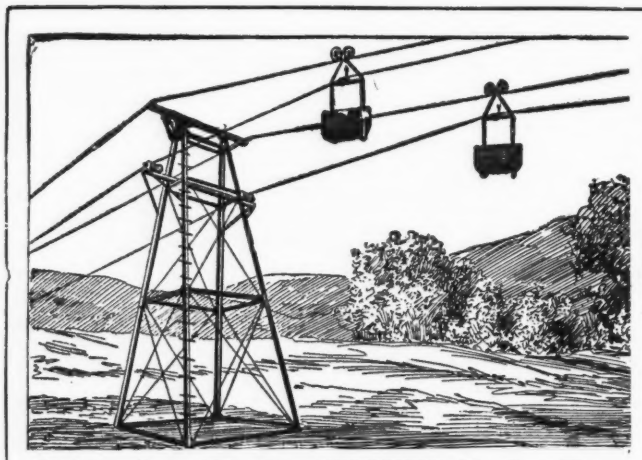

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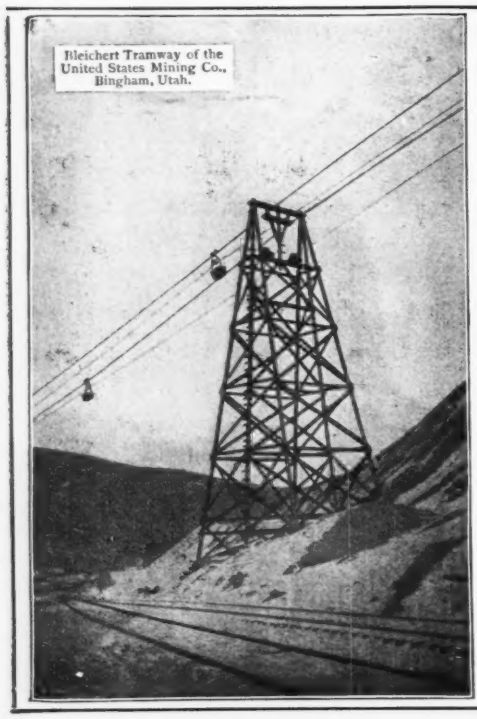

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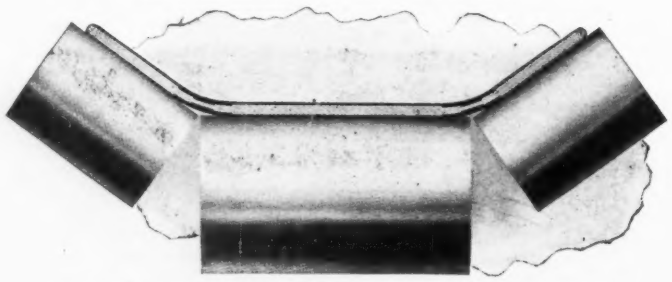

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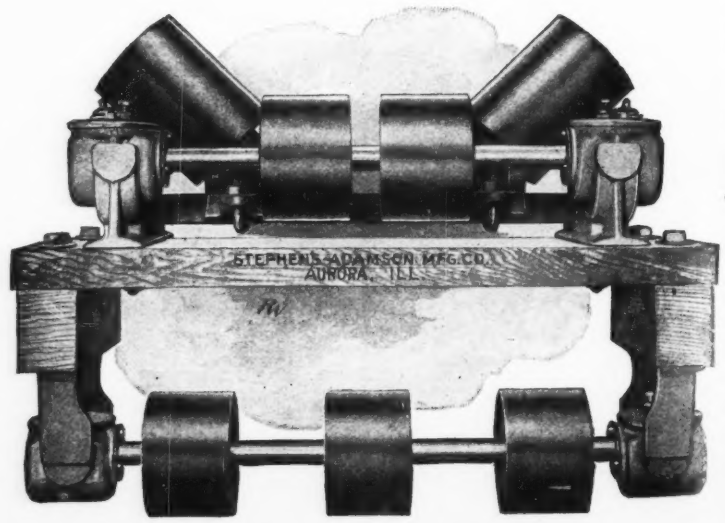

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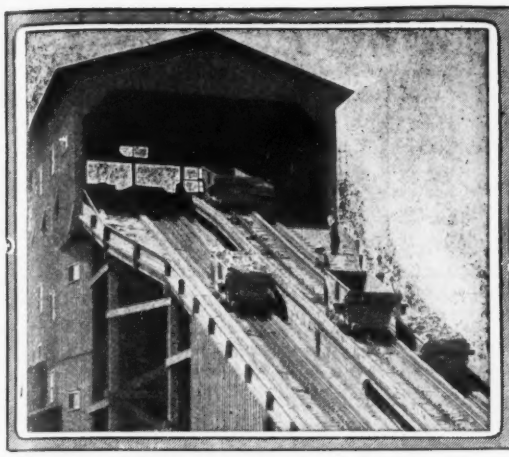

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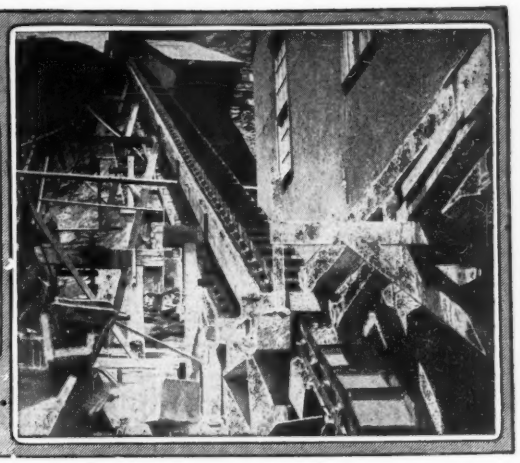

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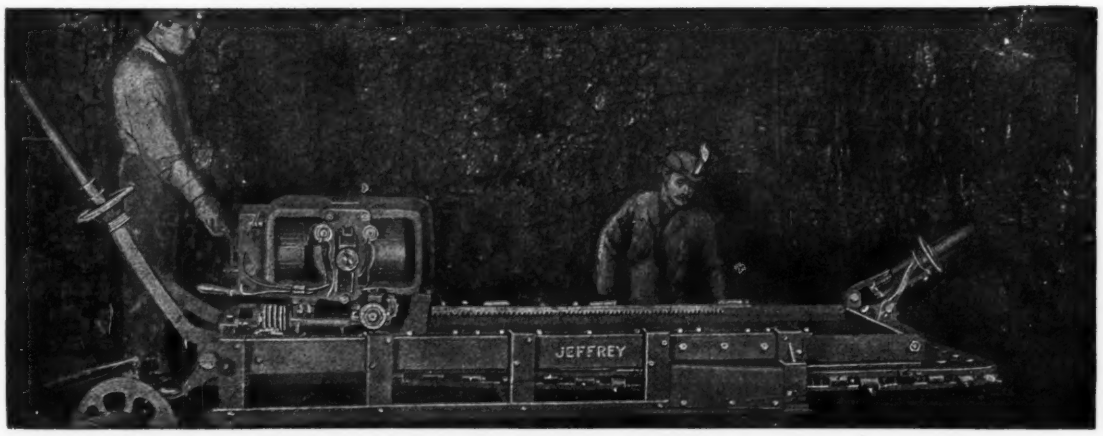

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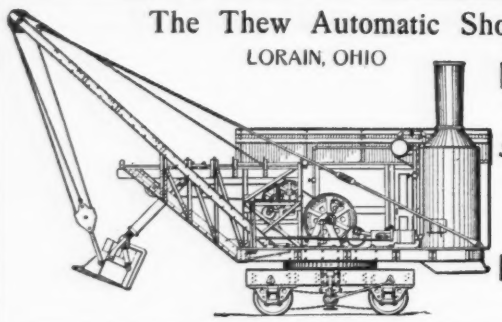

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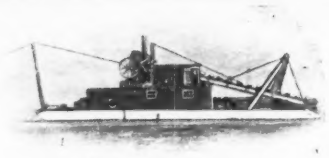

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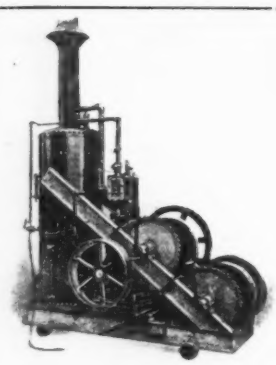

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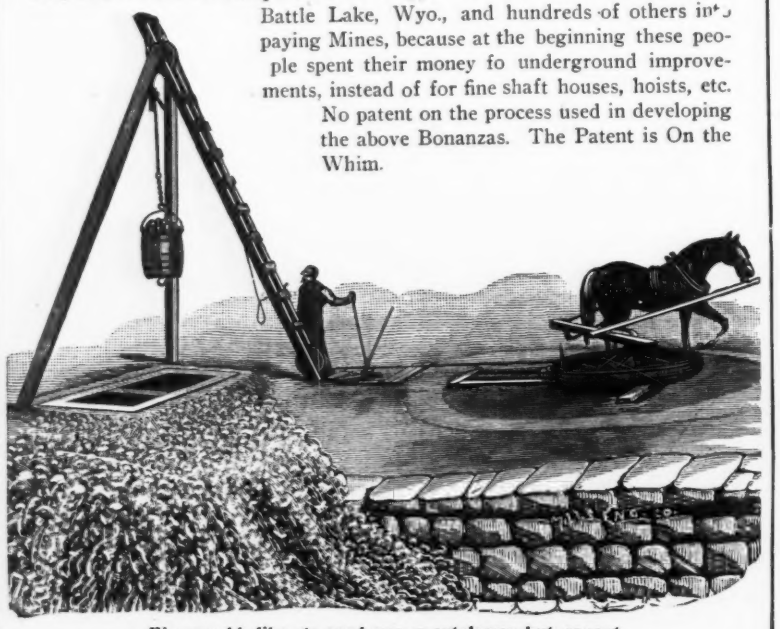

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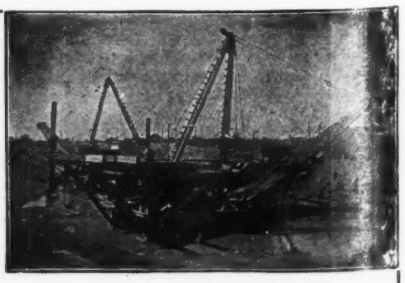

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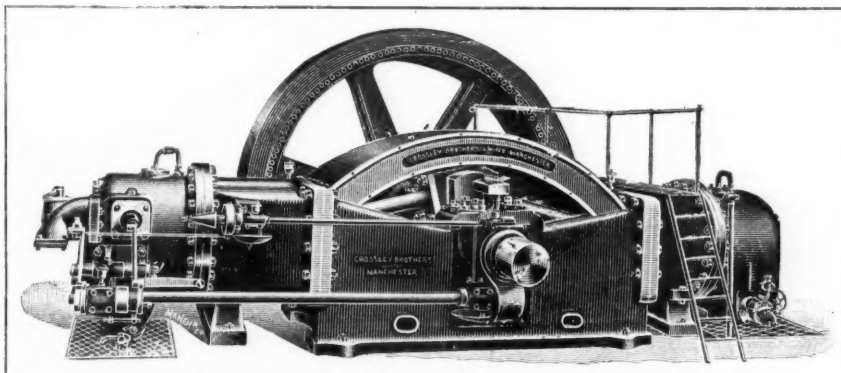

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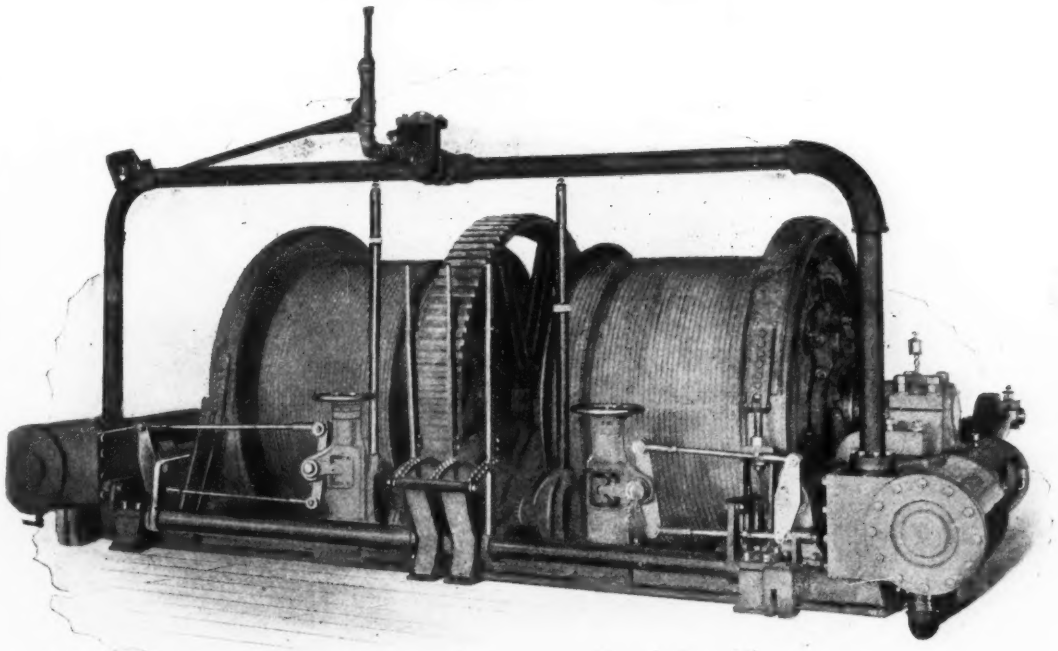

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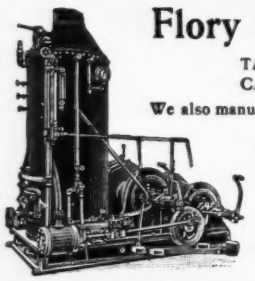

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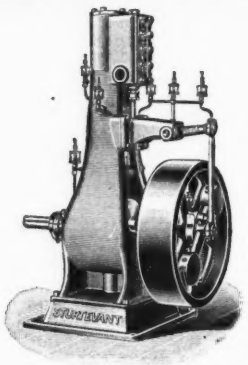

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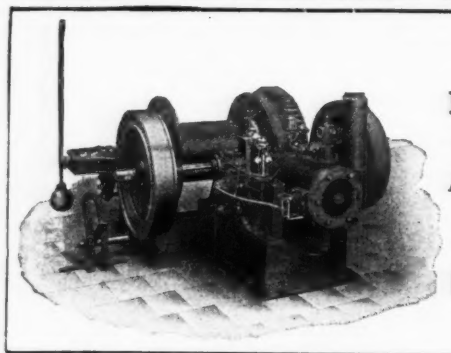

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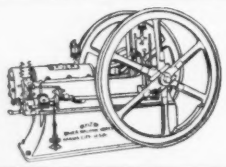

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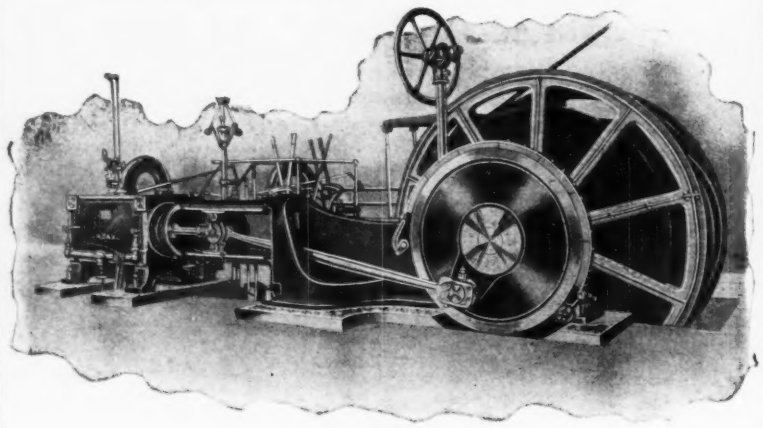

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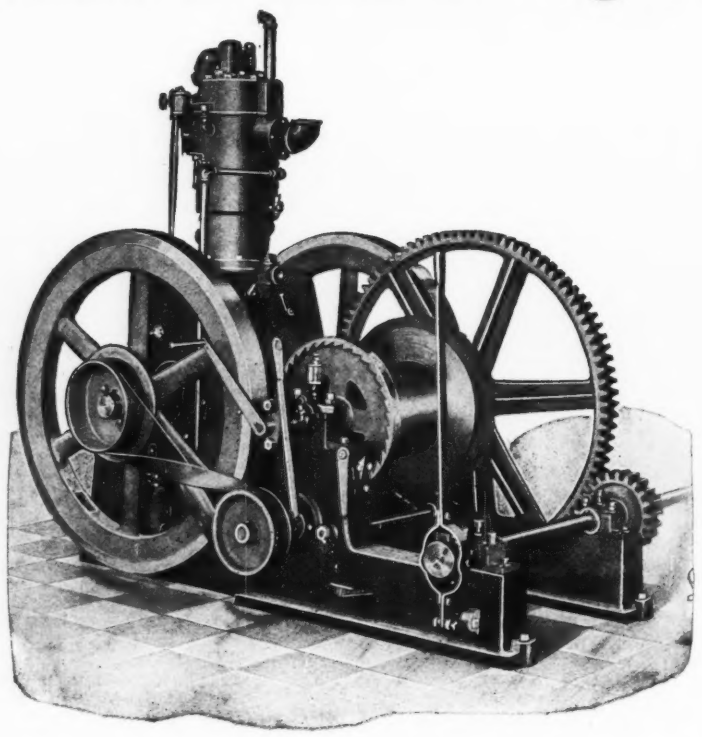

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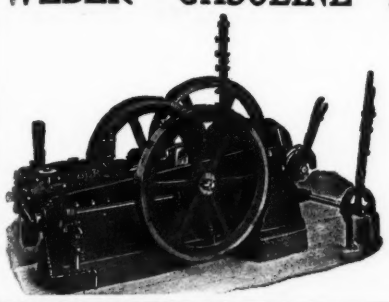

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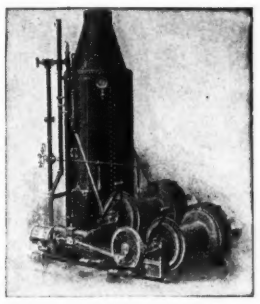

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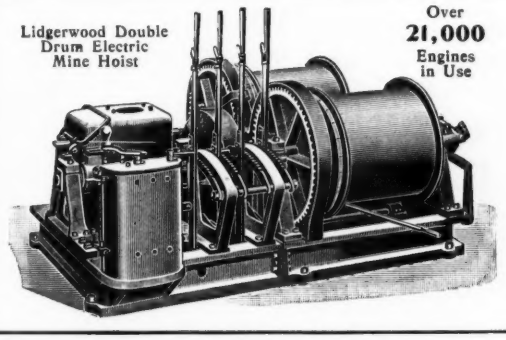

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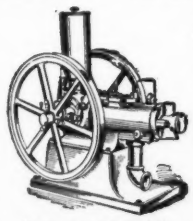

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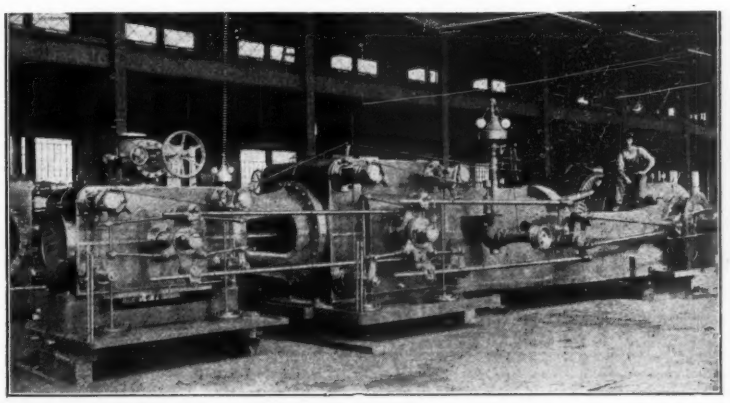

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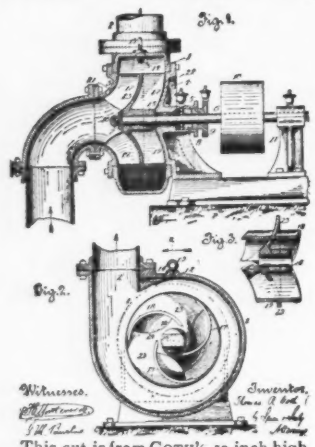

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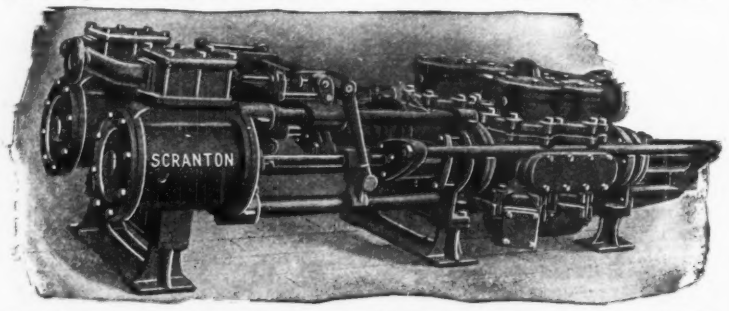

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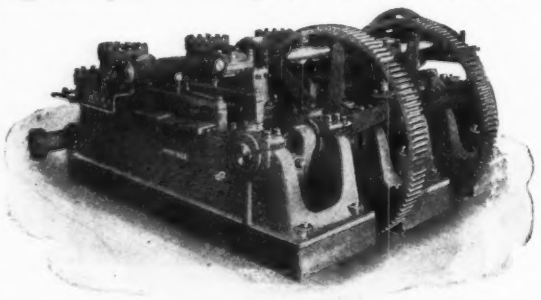

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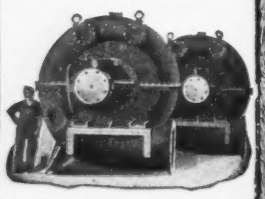

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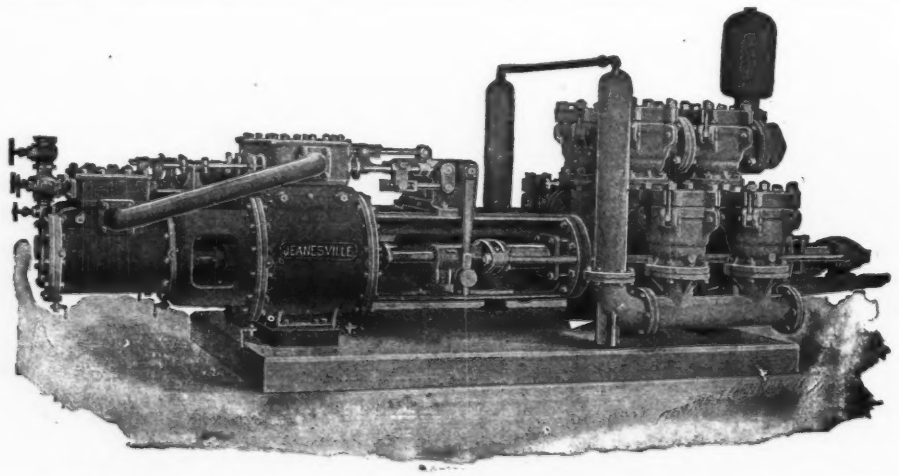

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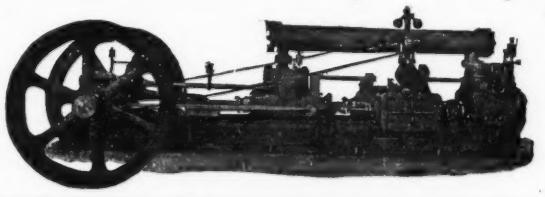

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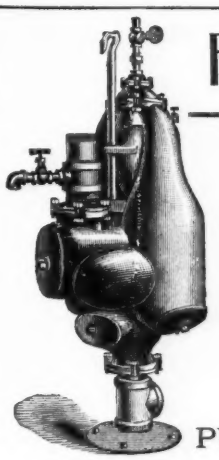

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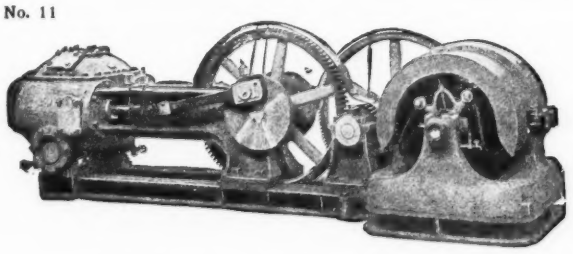

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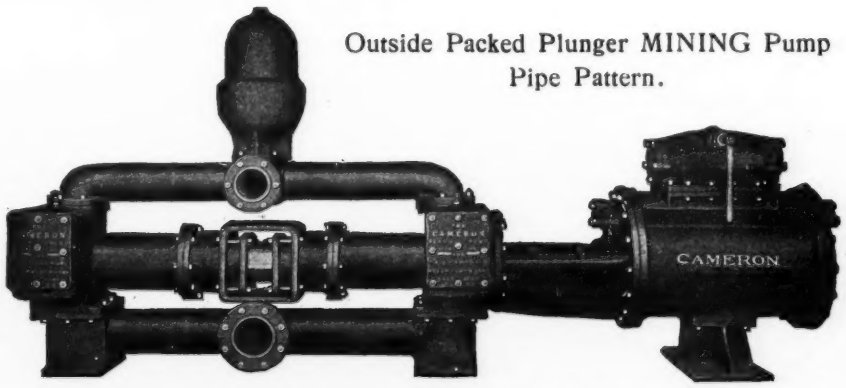

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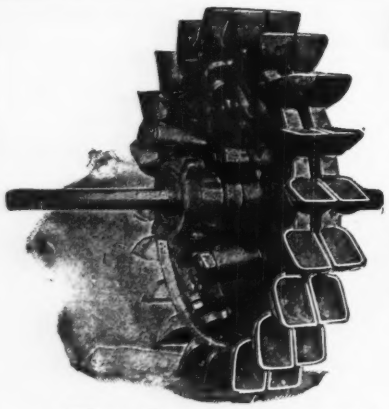

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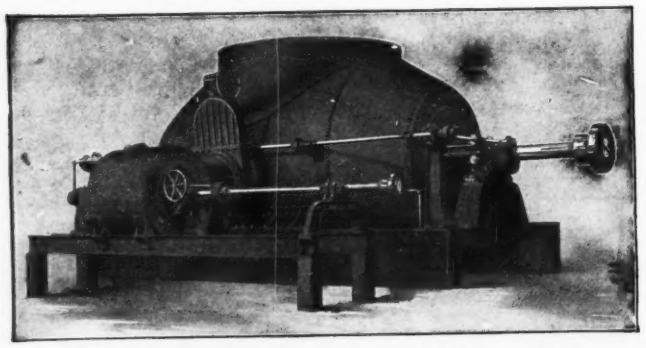

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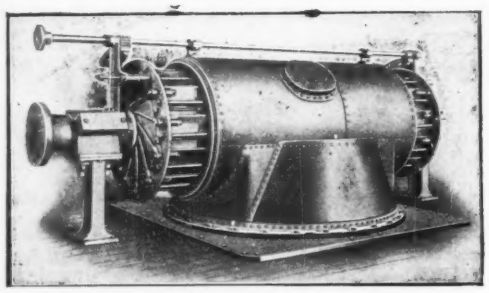

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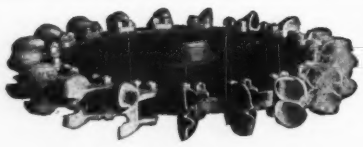

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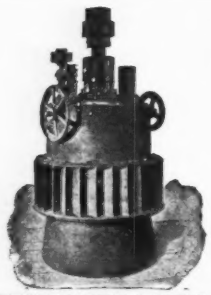

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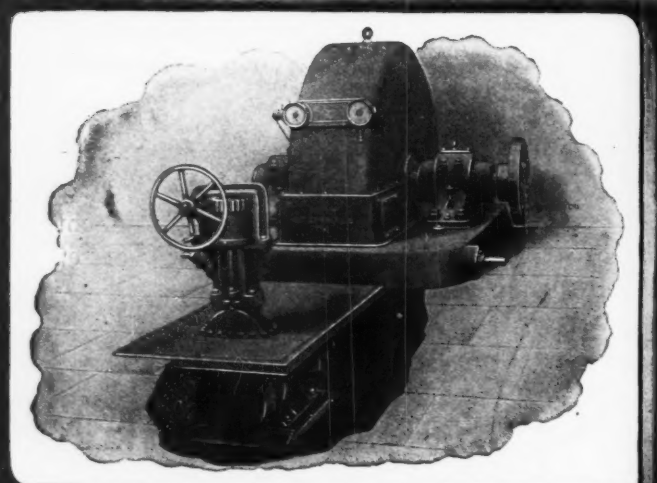

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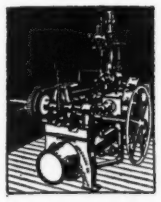

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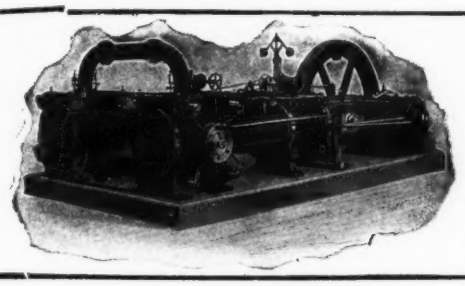

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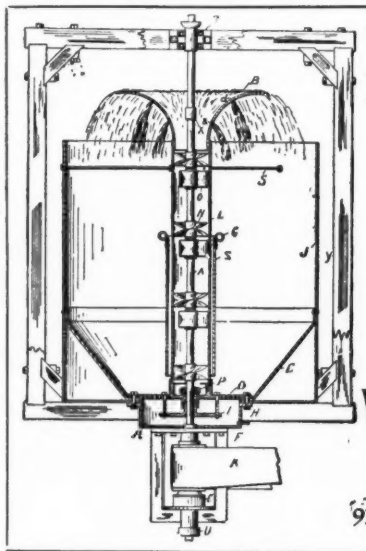

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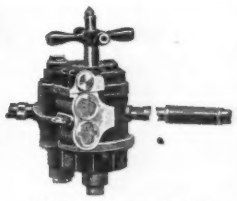

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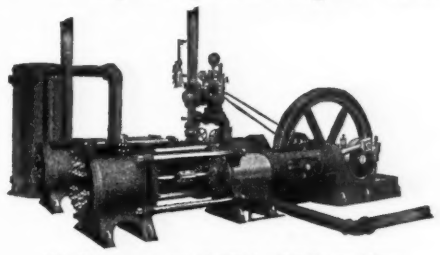

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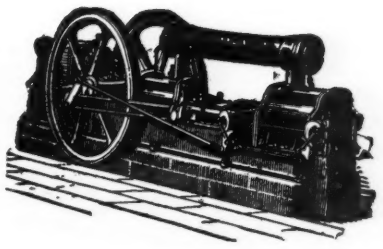

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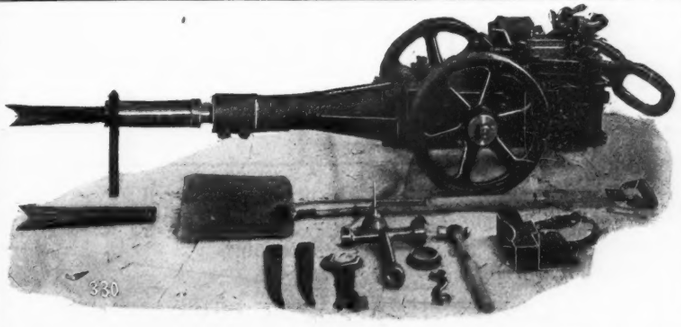

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GRADUATE in physics and chemistry, seven years' mining experience. Transvaal, Spain, Indo-China, wishes engagement as cyanide manager in gold mine, having or erecting cyanide plant. From personal observations on treatment of various tailings and pyritic concentrates, would if asked suggest improvements in precipitating gold solutions with little more expenses in plant, less cyanide consumption and benefit to extraction. Know assaying, smelting and bookkeeping. Address Newcomer, care Engineering and Mining Journal, 320 Sansome St., San Francisco, Cal.
No. 19,918, July 4.

MINING ENGINEER wishes position at metal mine in capacity of surveyor, assayer and assistant superintendent. Has had four years experience in mining work, and four on hydraulic and railroad work, both in field and office. Will furnish transit, level and assay balances. Good references. Age twenty-eight. Address Box 966, Salt Lake, Utah.
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WANTED—Position as manager of mines. Have had 20 years' experience as manager of Lake Superior mines. Have concentrated magnetic ores by electricity for years and Limonite and Hematite ores by water jigs and electricity. Best references. Address Bessemer, Engineering and Mining Journal.
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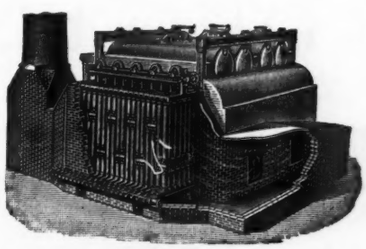

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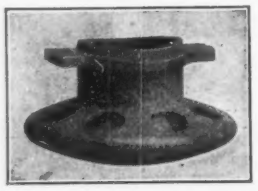

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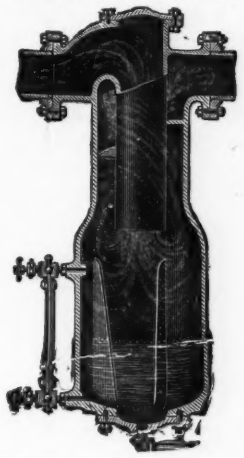

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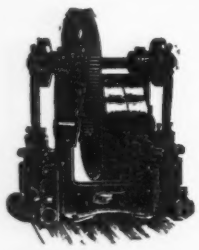

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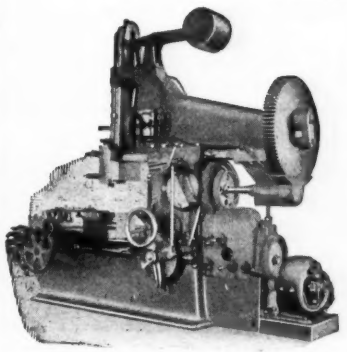

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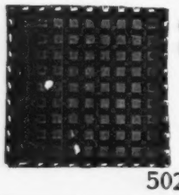

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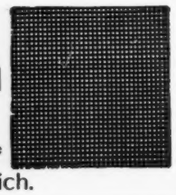

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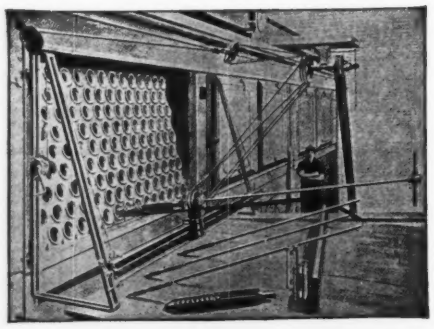

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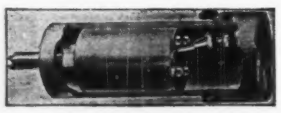

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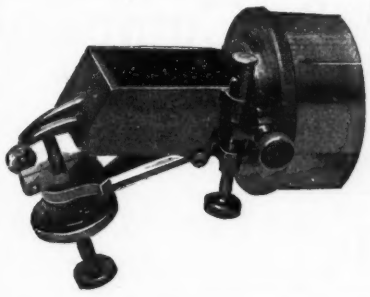

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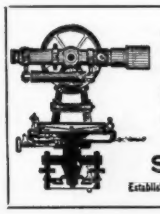

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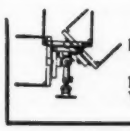

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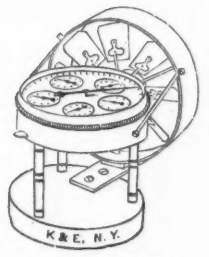

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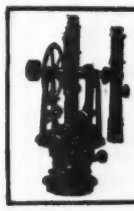

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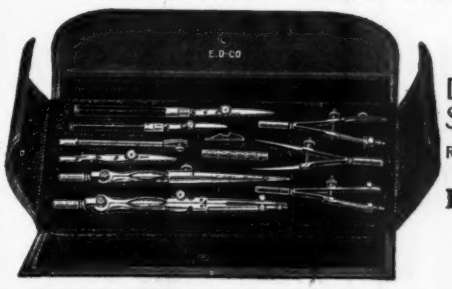

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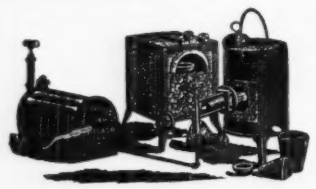

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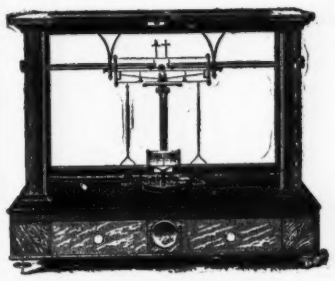

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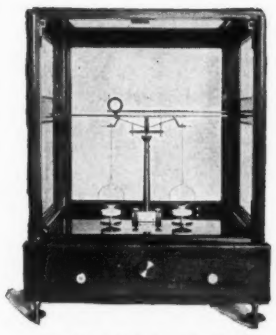

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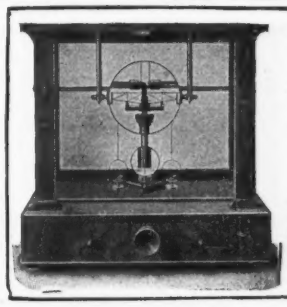

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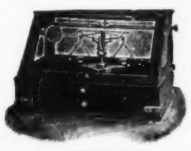

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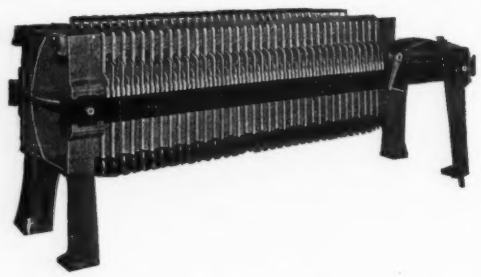

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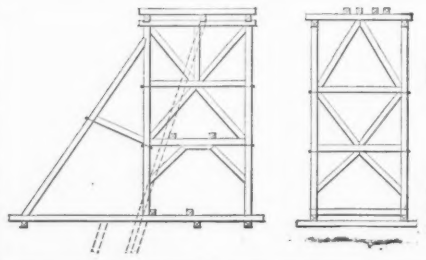

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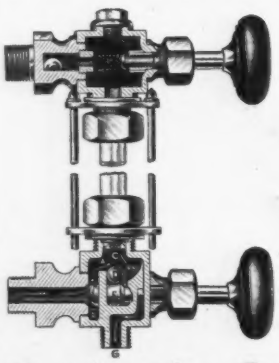

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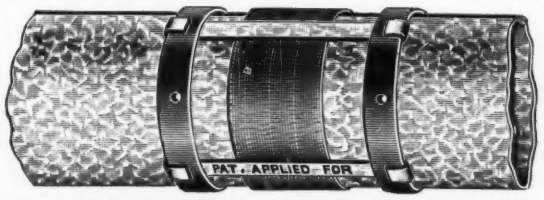

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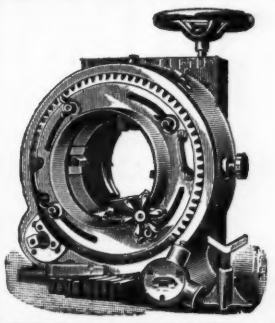

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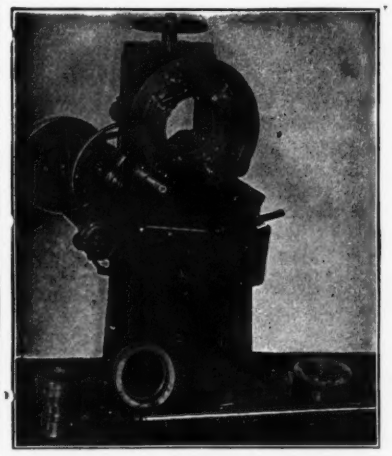

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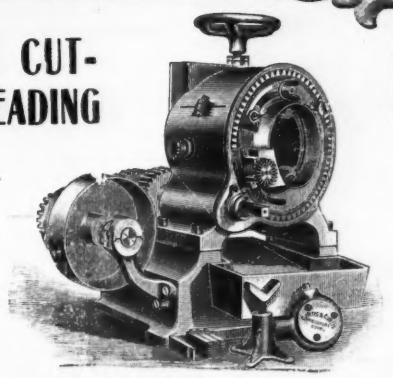

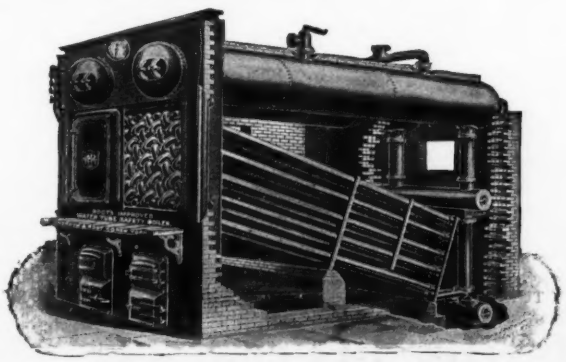

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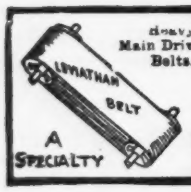

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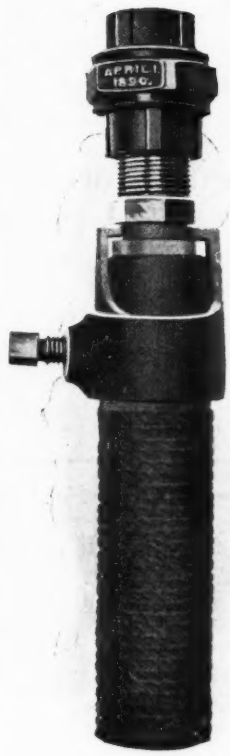

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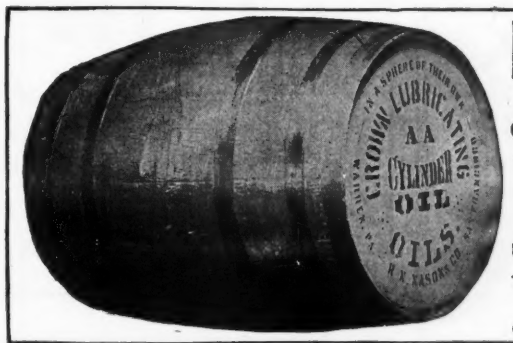

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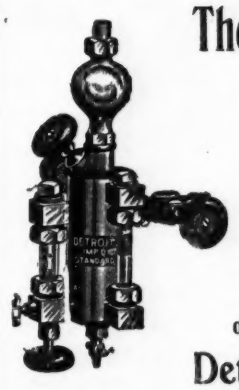

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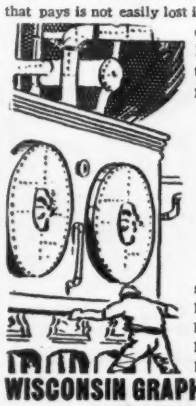

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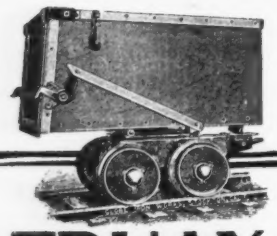

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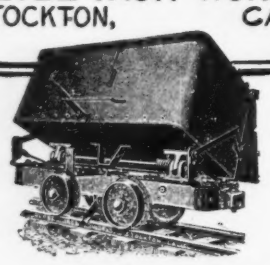

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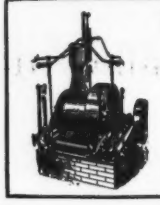

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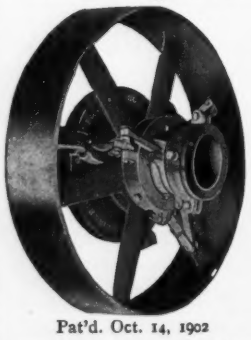

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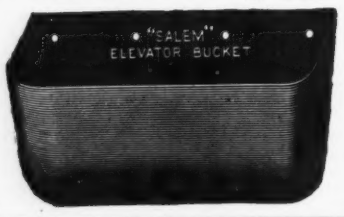

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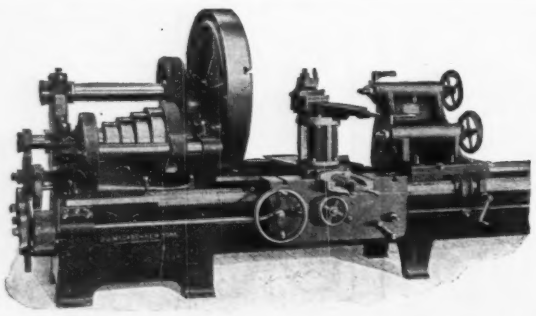

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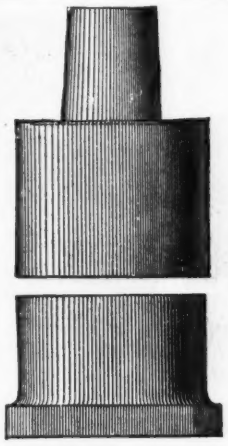

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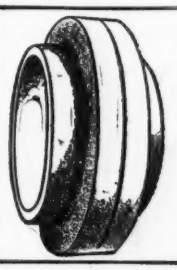

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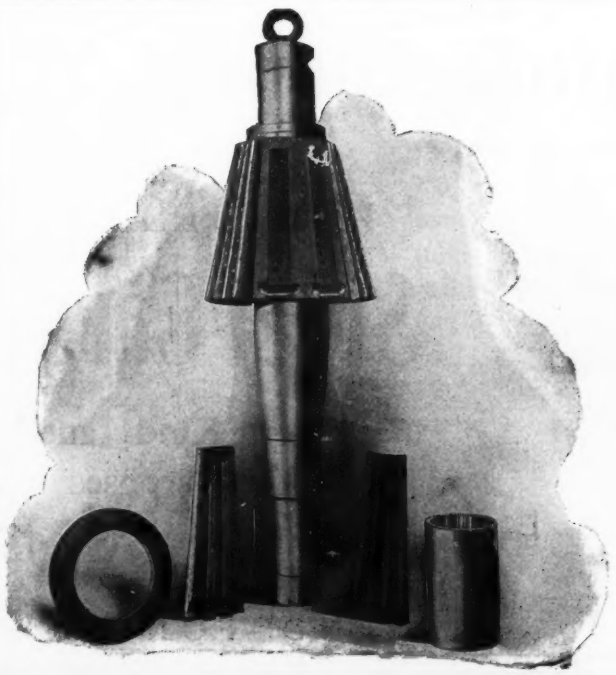

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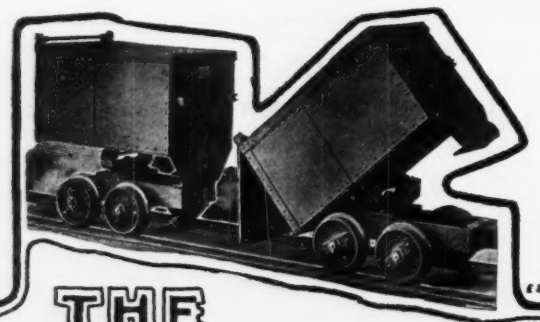

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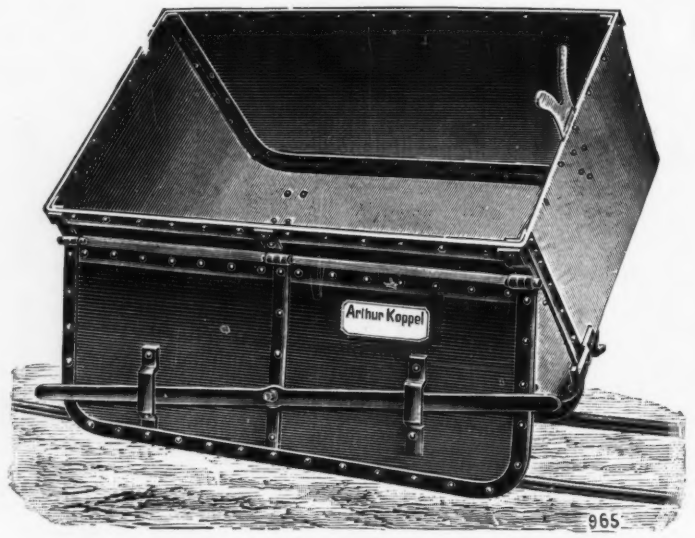

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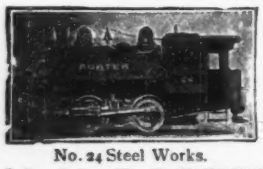

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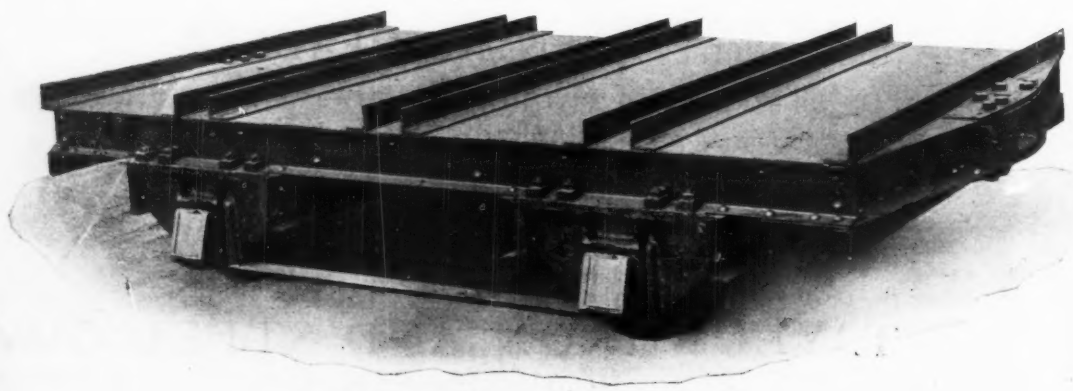

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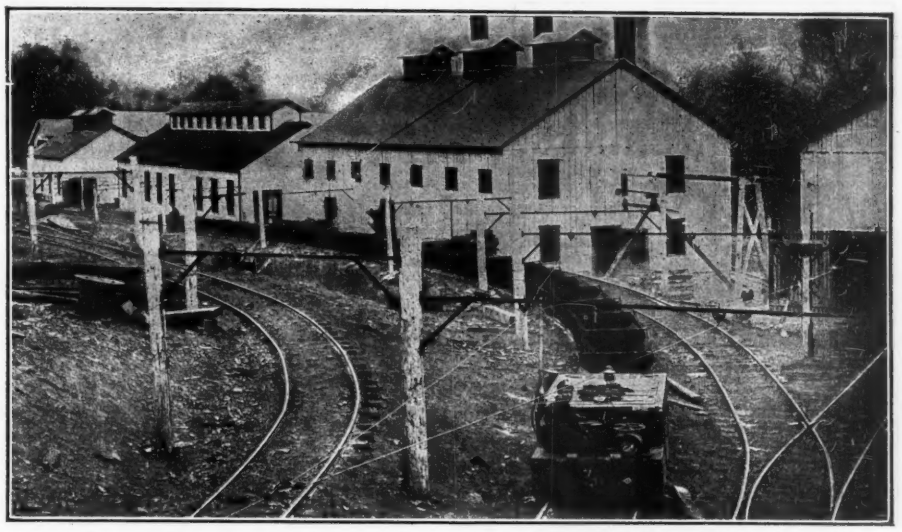

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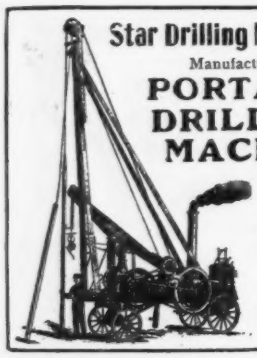

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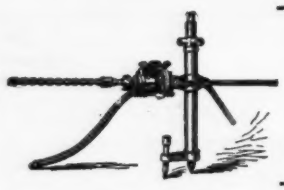

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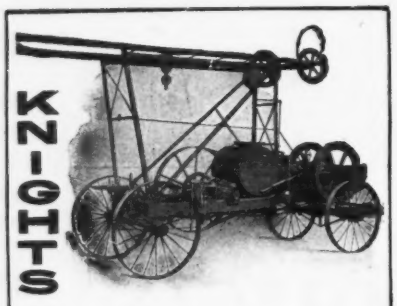

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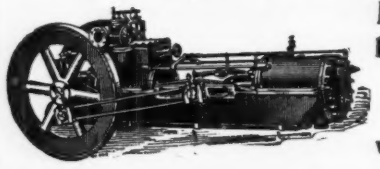

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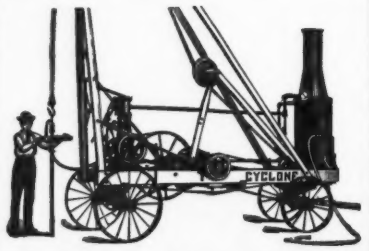

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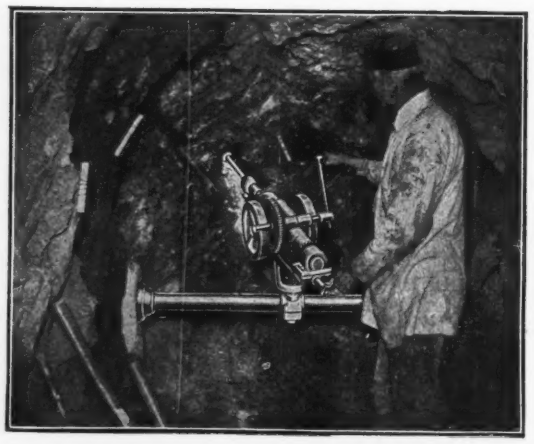

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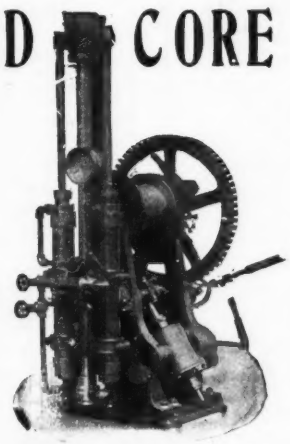

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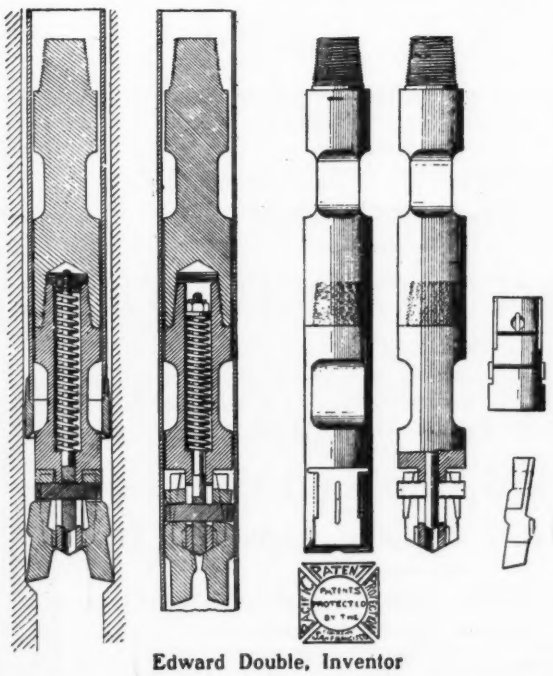

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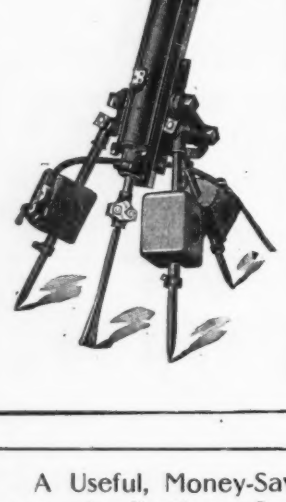

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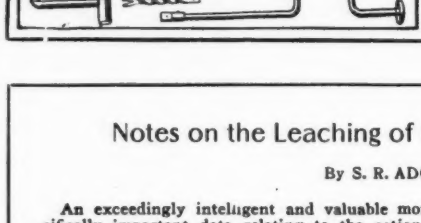

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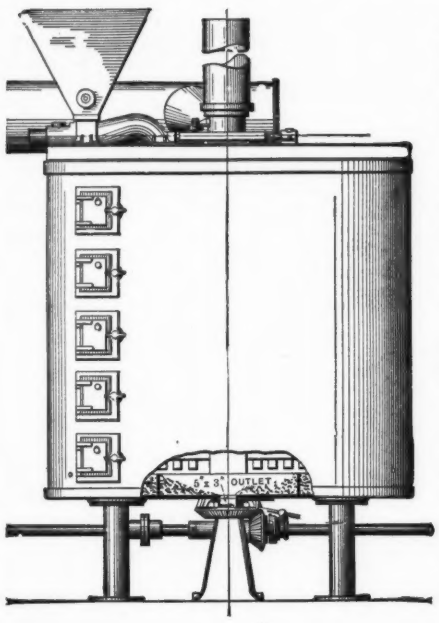

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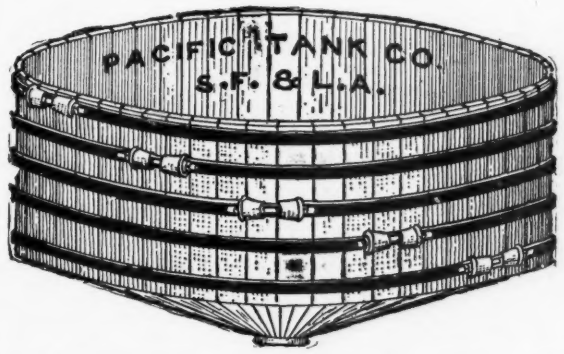

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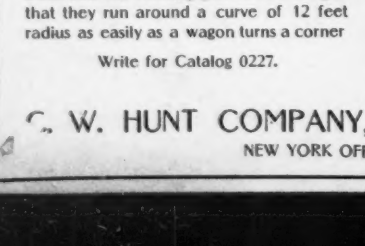

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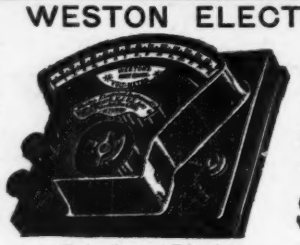
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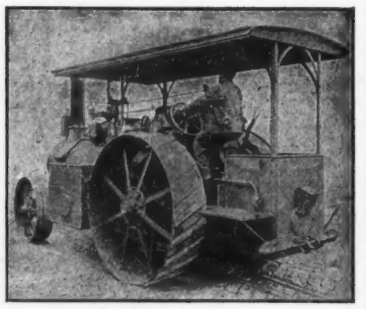

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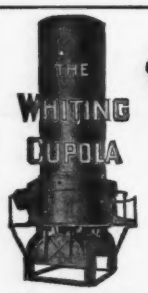

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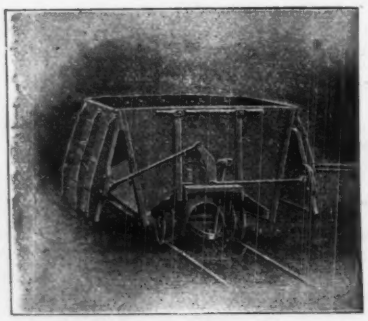

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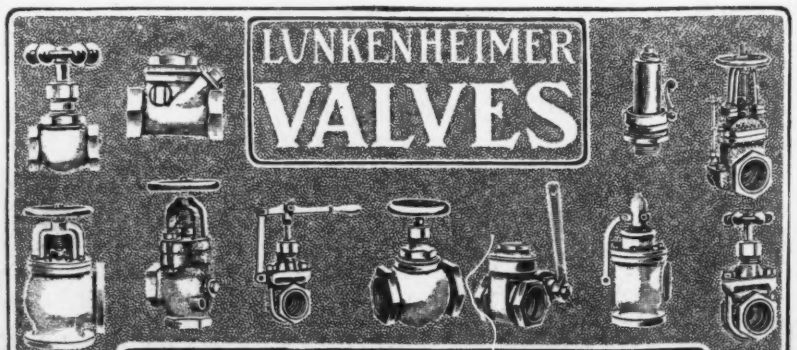

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